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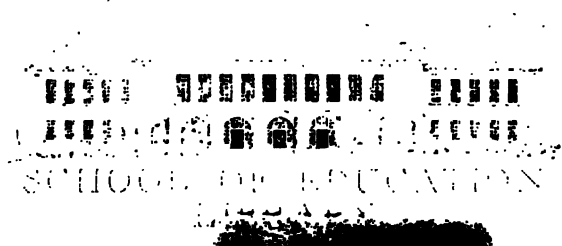
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Journal of Educational Research

*Official Organ of the National Association of Directors of
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VOLUME III

January-May, 1921

Published for the College of Education, Bureau of Educational Research
University of Illinois
by
PUBLIC SCHOOL PUBLISHING COMPANY
Bloomington, Illinois

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Public School Publishing Company

289662

289662 289662

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JOURNAL of EDUCATIONAL RESEARCH

VOLUME III

JANUARY, 1921

NUMBER 1

SOME RECENT RESULTS OBTAINED FROM THE OTIS GROUP INTELLIGENCE SCALE

STEPHEN S. COLVIN
Brown University

During the school year of 1919-1920, the Otis Group Intelligence Scale, Forms A and B, was given by students and teachers under the writer's direction to 2,588 children and older pupils in various schools in Massachusetts and Rhode Island as is shown in the following table. In all cases, Form A of the tests was administered first, and after an interval of some days or weeks Form B was given under approximately identical conditions.

SCHOOLS	GRADES	PUPILS	EXAMINERS
Brookline, Mass.	IV-IX	1,877	Teachers
Miss Wheeler's Private School for Girls, Providence, R. I.	IV-XII	147	Teachers and G. R. Dolloff, graduate student, Brown University
Belmont (Mass.) Junior High School	VII-VIII	259	W. A. Nickerson, teacher at Belmont, graduate student, Boston University
Reading (Mass.) High School	IX	115	Mrs. B. H. Cahill, graduate student, Boston University
Bridgewater Normal School	N. S.	190	Brenelle Hunt, Bridgewater Normal School, graduate student, Boston University

The results of the tests are consistent throughout in showing that the Otis norms, even in their revised form, are much too low for the group of children tested.¹ They are also consistent in showing that a considerable practice-effect results from giving the tests, since in all instances the averages and medians for Form B are definitely higher than for Form A. The results further indicate that in a large majority of cases the tests are of considerable prognostic value in determining the scholastic attainments of the pupils examined. These results will be discussed in more detail.

¹ The Haggerty tests, given under the writer's direction to a small group of children in Providence schools, show in this respect similar results.

Although Otis has based his norms on the results of the examinations of many thousand school children, his standards are clearly of little value in determining the actual intelligence of those tested in the schools here reported. The results in the Brookline schools are typical and enlightening in this respect. Both the median scores by ages and the median scores by grades show figures decidedly higher than the Otis standards (see Table I). That this result is not a matter of chance is definitely indicated by median scores and I. Q.'s obtained in other schools.

TABLE I. BROOKLINE (MASS.) PUBLIC SCHOOLS. DISTRIBUTION OF SCORES OF 1,877 PUPILS IN OTIS INTELLIGENCE SCALE

A. BY AGES

Age	Number of Cases	Median Score	Highest Score	Lowest Score
7½	2	81	97	65
8	16	58	105	32
8½	60	70.5	124	27
9	86	67.5	115	14
9½	113	78.5	163	26
10	142	80.5	164	23
10½	146	90	172	16
11	138	94	161	21
11½	157	109	194	19
12	167	118	195	24
12½	153	119.5	192	21
13	164	130	193	32
13½	181	133	194	36
14	116	135.5	191	29
14½	98	134.5	203	49
15	97	136	193	19
16	35	124	173	69
17	6	110	152	72

B. BY GRADES (IV TO IX INCLUSIVE)

Grade	Number of Cases	Median Score	Highest Score	Lowest Score
IV	330	63.5	124	14
V	332	83	164	19
VI	360	103.5	172	21
VII	261	107	195	26
VIII	344	133	194	49
IX	250	148.5	203	77

TABLE II. BROOKLINE (MASS.) PUBLIC SCHOOLS. CORRELATIONS BETWEEN FORMS A AND B AND BETWEEN INTELLIGENCE AND SCHOLARSHIP

School	Grade	Correlation between Forms A and B (<i>r</i> values)	Correlation between Intelligence and Scholarship(<i>r</i> values)	School	Grade	Correlation between Forms A and B (<i>r</i> values)	Correlation between Intelligence and Scholarship(<i>r</i> values)
Runkle.....	IV	.90	.78	Lawrence (cont.)	VI	.86	.79
	V	.76	.83		VII	.84	.67
	VI	.88	.59		VIII	.88	.74
	VIIA	.89	.85		IX	.92	.40
	VII	.84	.69	Heath.....	IV	.37	.50
	VIIIA	.83	.81		V	.87	.57
	VIII	.82	.78		VI	.77	.76
	IX	.84	.82		VII	.83	.61
					VIII	.85	.63
					IX	.73	.45
Pierce.....	IVA	.87	.75	Lincoln.....	IVA	.95	.80
	IV	.58	.57		IV	.75	.48
	VA	.85	.72		VA	.88	.40
	V	.86	.79		V	.72	.71
	VIA	.92	.46		VIA	.88	.76
	VI	.93	.69		VI	.93	.80
	VIIA	.92	.91		VIA	.92	.50
	VII	.97	.85		VII	.87	.74
	VIIIA	.95	.60		VIIIA	.89	.77
	VIII	.60	.41		VIII	.92	.56
	IXA	.82	.67		IXA	.91	.64
	IX	.85	.45		IX	.89	.52
Lawrence.....	IV	.83	.77				
	V	.79	.54				

TABLE III. MISS WHEELER'S SCHOOL, PROVIDENCE, RHODE ISLAND.
OTIS INTELLIGENCE SCALE

A. CLASSIFICATION OF PUPILS. GRADES IV TO VII INCLUSIVE

Form	Near Genius	Very Superior	Superior	Normal	Dull	Border- line	Total Number Tested
A	8	14	4	14	5	3	48
B	18	11	5	7	2	2	45

B. SCORES BY AGES. JUNIOR AND SENIOR HIGH-SCHOOL GRADES

Age	Forms A and B Averaged
13	151
14	158
15	166
16	173

C. SCORES IN FORMS A AND B FOR FIVE UPPER GRADES

GRADE	NUM- BER TESTED	FORM A		FORM B		FORMS A AND B COMBINED		CORRELA- TION BE- TWEEN A AND B	CORRELA- TION (A AND B COM- BINED) WITH SCHOOL GRADES
		Aver- age	Me- dian	Aver- age	Me- dian	Aver- age	Me- dian		
VIII	24	133	141	149	153	140	148	0.901	0.801
IX	17	144	151	165	170	154	155	0.720	0.671
X	16	155	157	173	179	164	169	0.699	0.253
XI	24	154	161	173	172	163	164	0.896	0.345
XII	18	169	174	186	190	177	181	0.854	0.657
All Grades	99	150	154	168	173	159	164	0.827	0.487

TABLE IV. BELMONT (MASS.) JUNIOR HIGH SCHOOL. DISTRIBUTION AND OVERLAPPING OF PUPILS IN OTIS INTELLIGENCE SCALE

SCORES	FORM A				SCORES	FORM B				FORM A				FORM B			
	Grade VIII	Grade VII	Grades VII-VIII	Grade VIII	Grade VII	Grades VII-VIII	Grade VIII	Grade VII	Grades VII-VIII	Grade VIII	Grade VII	Grades VII-VIII	Grade VIII	Grade VII	Grades VII-VIII	Grade VIII	Grade VII
25-29	.....	1	1	.....	.....	.....	.....	.....	.....	125-129	8	3	11	10	7	17	
30-34	.....	2	2	.....	.....	.....	.....	.....	.....	130-134	8	3	11	8	10	18	
35-39	.....	0	0	.....	.....	.....	.....	.....	.....	135-139	7	3	10	11	2	13	
40-44	.....	2	2	.....	.....	.....	.....	1	1	140-144	6	4	10	4	7	11	
45-49	2	2	4	.....	0	0	.....	0	1	145-149	1	.....	1	6	4	10	
50-54	1	4	5	.....	2	2	.....	2	4	150-154	4	.....	4	5	1	6	
55-59	2	6	8	1	3	4	.....	3	2	155-159	2	.....	2	3	3	6	
60-64	1	6	7	0	3	3	0	3	1	160-164	1	.....	1	5	.....	5	
65-69	4	10	14	0	6	6	0	6	0	165-169	0	.....	0	3	.....	3	
70-74	5	5	10	1	4	5	1	4	2	170-174	2	.....	2	0	.....	0	
75-79	5	6	11	4	5	9	4	5	.....	175-179	.....	.....	.....	0	.....	0	
80-84	8	9	17	1	7	8	1	7	.....	180-184	.....	.....	.....	1	.....	1	
85-89	10	10	20	6	7	13	6	7	.....	185-189	.....	.....	.....	2	.....	2	
90-94	6	7	13	6	5	11	6	5	.....	Totals...	130	131	261	124	135	259	
95-99	8	13	21	5	8	13	5	8	.....	Medians	111	91	99	123	109	117	
100-104	5	7	12	7	7	14	7	7	.....	High ...	171	143	171	189	157	189	
105-109	7	9	16	6	13	19	6	13	.....	Low ...	47	27	27	59	41	41	
110-114	11	7	18	6	11	17	6	11	.....							
115-119	11	5	16	9	14	23	9	14	.....							
120-124	5	7	12	14	5	19	14	5	.....							

For example, results obtained from Miss Wheeler's School (see Table III) show, from the fourth to seventh grades inclusive, that considerably more than half of the pupils tested fall in the classes near genius, very superior, or superior, while only a small percent are below the average. In the grades of both the junior and senior high school the medians of the two forms, when averaged and compared with age norms, are decidedly above the Otis medians for adult intelligence. Similar results are secured when the medians of the combined scores of the five upper grades are calculated, the range being from 148 to 181 inclusive—from 18 to 51 points above the Otis standards for adult intelligence.

Mr. Nickerson's results in the Belmont Junior High School, as shown in Tables IV and V, point in the same direction. For example, of 124 pupils in the eighth grade taking Form B, 97 attained ranks normal or above for their respective ages, and only 27 fell below this rank. Results were practically the same for the seventh grade. While the results were not on the whole as pronounced as in the case of the other schools, the evidence is clear that here the Otis standards are also too low.

TABLE V. BELMONT (MASS.) JUNIOR HIGH SCHOOL.
PEARSON COEFFICIENTS OF CORRELATION

Forms A and B.....	0.90
Average scores and marks (English, arithmetic, geography).	0.55
Intelligence ratings and marks (English, arithmetic, geography).	0.61
Age-grade (youngest to oldest) and intelligence scores.....	0.34

According to the results in the Reading High School (Table VI), nearly 76 percent of the pupils tested show average mental ages at or above the grade in which they are working. Only 24 percent of the pupils tested have intelligence ratings below average; while 48 percent are above average—these latter falling into the superior, very superior, or near-genius groups.

The results obtained from the Bridgewater Normal School by Mr. Hunt (Figures 1 and 2) relate to students of adult age. Here the medians for all classes are decidedly above the Otis norms and the classification according to "coefficients of brightness" shows that there is not a single student below average, while 89 percent are above.

TABLE VI. READING (MASS.) HIGH SCHOOL.
RESULTS OF OTIS SCALE WITH 115 FIRST-YEAR PUPILS

A. DISTRIBUTION OF PUPILS BY TYPES
ON THE BASIS OF THE OTIS REVISED

NORMS	
Classification	Percent of Pupils
Genius	0.8
Very Superior ..	32.2
Superior	15.6
Normal	27.1
Dull	15.6
Borderline	8.7

B. DISTRIBUTION OF PUPILS ACCORDING
TO MENTAL AND CHRONOLOGICAL AGES

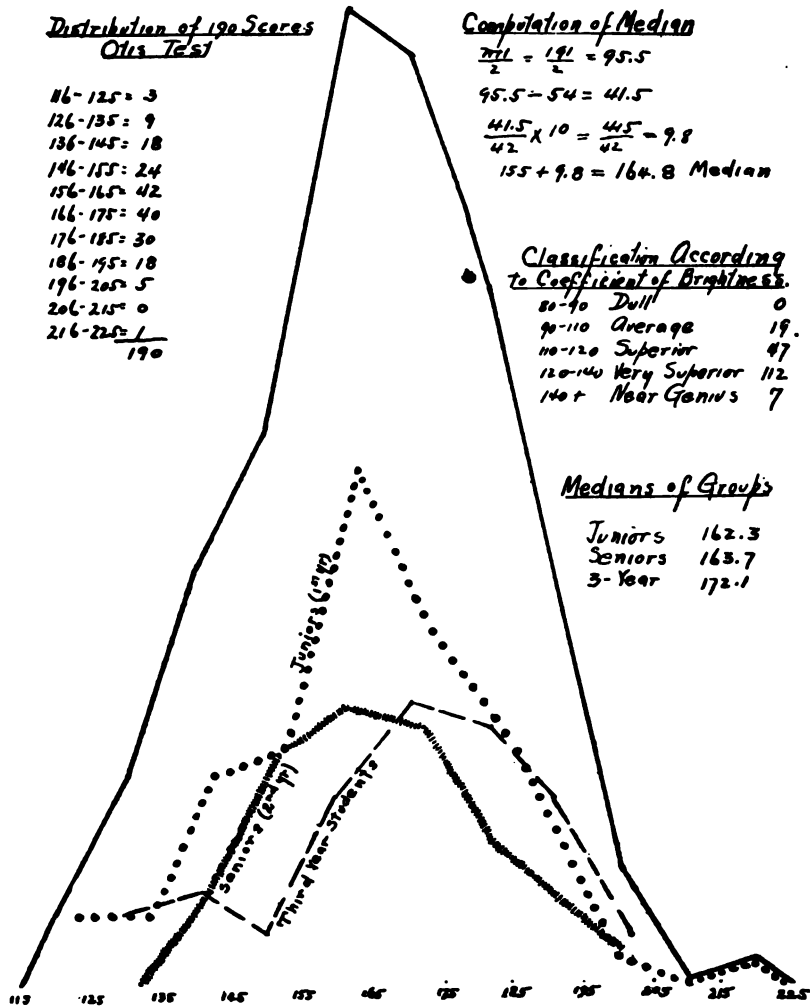
Percent of Cases	Average Mental Age	Average Chronological Age
3.0	10.6	14.8
6.0	11.4	14.8
9.0	12.5	14.9
15.0	13.4	14.7
15.0	14.4	14.6
5.0	15.6	14.5
3.0	16.5	14.7
7.0	17.2	14.8
37.0	18.0	14.2

Three possible explanations for the above results suggest themselves, namely: (1) the norms have not been carefully derived by Otis from representative groups; (2) the individuals examined in the tests here reported form a superior group; (3) the tests necessarily measure school accomplishment of a certain type (not merely general intelligence) and the individuals tested had superior instruction in those particular elements on which the tests are based. Of these three explanations we can probably exclude the second. It is hardly plausible that the pupils tested in the present study are markedly superior to the rank and file of school children, and that a large percent are in the superior and near-genius groups.

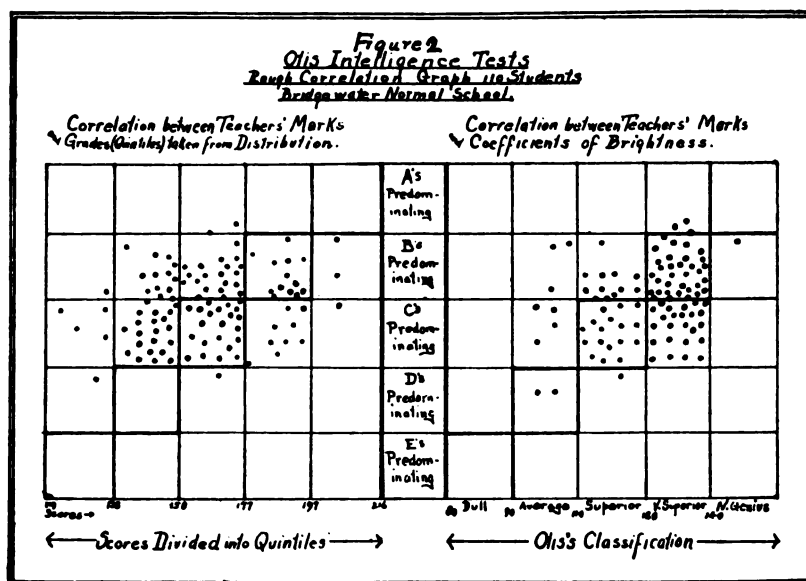
The first explanation is possible, though it is reasonable to assume that the norms derived by Otis are from fairly representative groups and constitute reasonable samplings of school children in general. It is also to be assumed that the norms as obtained by Otis from various sources have been carefully derived, and that there is no large error resulting from statistical inaccuracies. Even if such errors exist, they are not likely to be constant and would probably tend to even themselves up in the tabulation of the large number of cases on which the norms are based.

The third explanation seems the most reasonable in accounting for a substantial amount of the disagreement found between the Otis norms and the results here reported, namely, that the Otis tests furnish materials which give a greater advantage to the

Figure 1:
Bridgewater Normal School



individuals tested in the present study than to those from whom Otis has obtained his norms. The Otis tests are primarily literary tests; they are based on a knowledge of words and skill in the use of words. They put a premium on linguistic ability, and make



it possible for pupils who have had superior training in this respect, other things being equal, to obtain higher scores.

And here a word in regard to intelligence tests in general may not be out of place. *No intelligence test yet devised, and in all probability none that ever can be devised, is capable of measuring general intelligence except indirectly.* These tests measure attainment which is conditioned on learning. When a group of individuals vary in any test in which all have had the same incentives for learning and the same opportunities and interests in learning, the assumption is that this variation is due to differences in original ability. For this reason not only are intelligence tests measures of original capacity, but so also are the various attainment tests in school subjects. Hence the Trabue Completion Test, devised as a measure of linguistic ability, is also a measure of intelligence; hence the Courtis arithmetic tests not only measure attainment in fundamental operations, but they likewise discriminate between the innate abilities of the children tested. *There has never been devised and there will probably never be devised a general test for general intelligence.* All tests are valid only within a group who have had identical or very similar opportunities for gaining familiarity with the materials of the test, and who not only have had the opportunity to learn, but likewise the desire to learn.

The fact that a group of girls score decidedly lower in the Stenquist Mechanical Ingenuity Tests than a similar group of boys does not prove by any means that girls are inferior in innate mechanical intelligence to boys. Neither does the fact that girls and women, almost without exception, show median scores inferior to those obtained by similar groups of boys and men in the Alpha Army Tests of necessity indicate that the former are inferior to the latter in general intelligence. It is not to be expected that intelligence tests can be standardized so as to measure the innate intelligence of diversified groups. Such tests are valid only as comparative measures within groups. It is very difficult, if not impossible, to compare the intelligence of dissimilar groups.

The practice effect shown by the fact that the median scores in the second test of the Otis pairs are considerably higher than those in the first set is, of course, to be expected. In the writer's experience this is almost certain to be true when any two tests, of approximately equal difficulty, are given to any group of fair size. In the case of hundreds of tests given to thousands of individuals either by the writer or under his direction, he has found but one instance when a reversal of this result occurred. This was in a group of about 35 seniors in the Women's College in Brown University in which the scores in a pair of the Trabue Completion Tests were somewhat higher in the first test than in the second.

In the case of the present study, on the average, the second test showed about a 10 percent improvement over the first. In one instance, the seventh grade of the Belmont Junior High School, a 20 percent improvement is shown (see Table IV). The results from Miss Wheeler's School are typical (see Table III). In the writer's experience the improvement to be expected in the second test over the first is from 6 to 10 percent. In this connection it is to be noted that in the Thorndike Intelligence Examination for High School Graduates the improvement in the second of two identical tests over the first, when preceded by a fore-exercise giving some familiarity with the nature of these two tests, is much reduced. Results obtained at Brown University with 285 freshmen of the Class of 1923, to whom the Thorndike tests were given, showed an improvement of less than 2 percent. Evidently some such device as a fore-exercise for preliminary orientation, or a spiral scheme in which the same type of test occurs again and again in the course of an examination, as is the case

with the Thurstone Psychological Examination is of considerable importance in the technic of administration.

Although the Otis tests seem to be of little value in discovering the exact intelligence ratings of those examined,³ they are clearly useful in indicating the relative intelligence of the children tested within a given group. This fact is brought out by the agreement between the results of the tests and the school standing of the pupils examined. The correlations are, on the whole, pronounced, in some cases being unusually high. Forty-four correlations calculated between the test scores in the Brookline schools and the scholarship records give the lowest Pearson coefficient 0.40 and the highest 0.91. The median is 0.69. Seven of these coefficients are between 0.40 and 0.49, eight between 0.50 and 0.59, eight between 0.60 and 0.69, thirteen between 0.70 and 0.79, seven between 0.80 and 0.89, and one between 0.90 and 1.00 (see Table II).

In Miss Wheeler's School, correlations between scores in the tests and school standing were computed for the five upper grades. These varied from 0.253 to 0.801 when calculated grade for grade. The correlation of the scores of all the pupils tested in these five grades with their school marks was 0.487 (see Table III).

In the Belmont Junior High School, the average scores in the tests when compared with the average of school marks in English, arithmetic, and geography gave a Pearson coefficient of 0.55. When the scores were reduced to intelligence ratings the correlation was 0.61 (see Table V). Of 124 eighth-grade pupils taking the test, 97 obtained ranks normal or above for their respective ages. Of the 27 failing to attain such a rank, 17 failed to receive a passing mark in their school subjects. Five of the 27 were repeating the grade; seven were promoted on conditions; one was demoted; four were manual training specials. The rating of these pupils by their teachers was as follows: seven, fair; fifteen, poor; three, very poor. Of the 97 pupils who passed the test with scores at least normal, only 13 were estimated as below fair or passable in regular school work, 84 receiving marks of three or better (on a basis of five). The correlation between the C. B's. of these 124 pupils and their average rank in four school subjects

³ The results set forth above are in substantial agreement with results reported to the writer by other investigators who have administered the tests in various school systems.

was 0.586. Results from a study of conditions in the seventh grade were very similar.

The data from the tests given to the freshmen of the Reading High School showed on the whole less definite results and gave low correlations with school standing, the Pearson coefficient between the I. Q.'s and the average of the academic grades being 0.344. In a total of 65 failures received in all subjects of the freshman year, 40 percent were made by those pupils who fell below the normal or average group according to the Otis classification, and 60 percent were made by those who were in the normal group or above it.

No correlation coefficients were obtained from the results obtained by Mr. Hunt at the Bridgewater Normal School. Figure 2, however, indicates that there is a close agreement both between teachers' marks and scores divided into quintiles, and teachers' marks and the calculated C. B.'s. Figure 1 shows also that the senior students are slightly superior to the junior students, while the three-year students (those taking a longer course than the one usually elected) are more definitely superior. Evidently the better course is elected by the more capable individuals.

One more fact of some significance may be noted, namely, that in most instances there is a substantial agreement between the results obtained from the two series of tests. The scores in Forms A and B were correlated in 49 instances with the following results: in fourteen instances the coefficient was between 0.90 and 1.00; in twenty-five instances, between 0.80 and 0.90; in seven instances, between 0.70 and 0.80; in one instance, between 0.60 and 0.70; in one instance, between 0.50 and 0.60; and in one instance, between 0.30 and 0.40.

The final conclusion to be drawn from an examination of the results of these tests is that they serve a very useful purpose in determining the comparative intelligence of school children and that their prognostic value is reasonably high. On the other hand, they are quite misleading as measures of absolute intelligence, and attempts to determine intelligence quotients or coefficients of brightness based on results obtained and interpreted in terms of the standards so far published by Otis are of little value. The Otis norms must be fundamentally revised before they can be accepted without correction.

CONDITIONS REVEALED BY THE USE OF STANDARDIZED TESTS IN RURAL SCHOOLS¹

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While making out the graph cards of individual pupils for grading purposes as described in my last article, I gradually became conscious of certain similar tendencies affecting the majority of graphs. Not only was the variation great among individuals in different subjects but there was a certain sameness in it that struck me as being significant of fundamental weaknesses in the school system. If the graphs had been on transparent cards and placed in a pile, their low and high points would have tended to coincide. That is, in certain subjects most of the pupils tended to grade high throughout the district while in other subjects they tended to grade low.

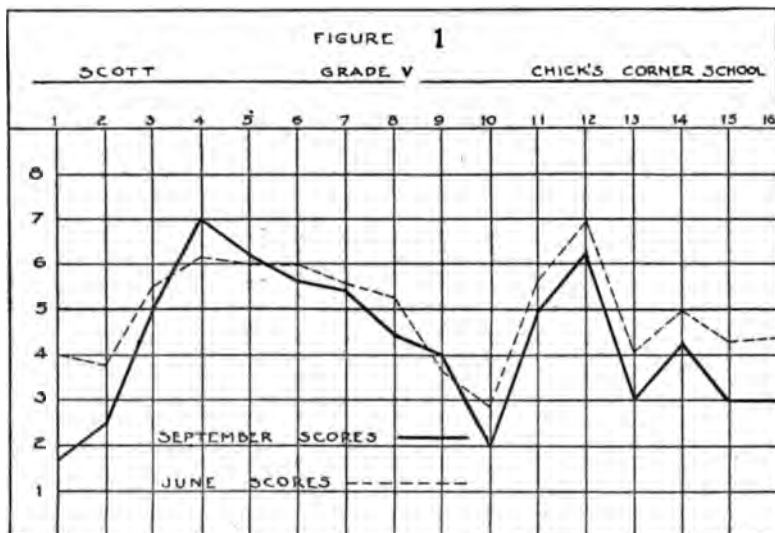
In the accompanying figures the numbers at the left of the horizontal lines represent the grades, while those at the top of the vertical lines stand for the various subjects as follows:

- | | |
|-------------------------------------|----------------------------|
| 1. Rate of silent reading | 9. Writing, rate |
| 2. Comprehension in reading | 10. Writing, quality |
| 3. Addition | 11. Arithmetical reasoning |
| 4. Subtraction | 12. English organization |
| 5. Multiplication | 13. Visual vocabulary |
| 6. Division | 14. Language |
| 7. Mixed fundamentals of arithmetic | 15. Geography |
| 8. Spelling | 16. History |

In each of these figures the heavy horizontal line is drawn at the grade in which the pupil was placed as a result of the September testing. (See the third article of this series.) The solid lines show the grading of the pupils according to each of the tests at the beginning of the year; the broken lines show their grading at the end of the year. In interpreting these figures it should be remembered that the grading is based on June scores. In other words, if a child's score on any test equals the standard

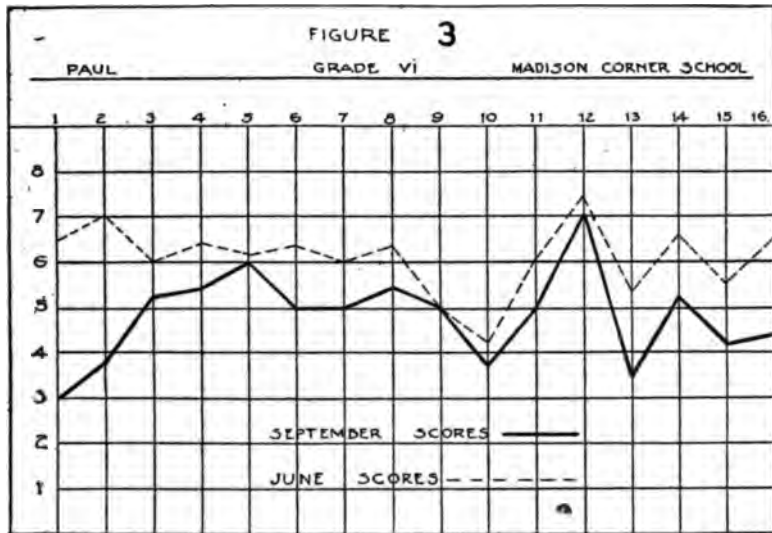
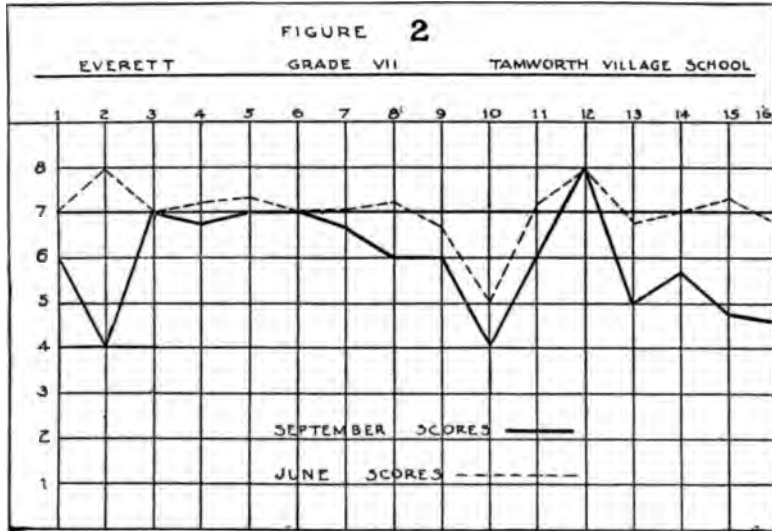
¹ This is the fourth article by Superintendent Brooks on the general topic "Putting Standardized Tests to Practical Use in Rural Schools."

for the fourth grade, his performance is that of a child who has completed the fourth grade. Since his scores (obtained in September) indicate that he has already attained fourth-grade proficiency, he will naturally be placed in the class which is just beginning the fifth-grade work.

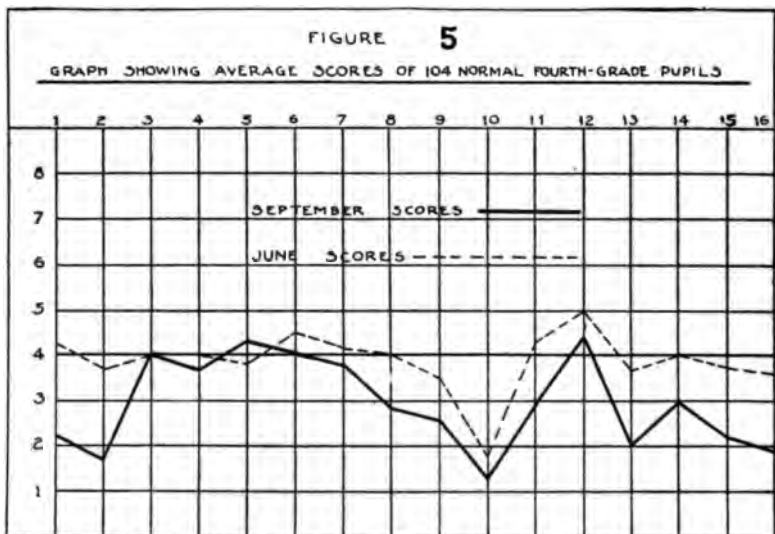
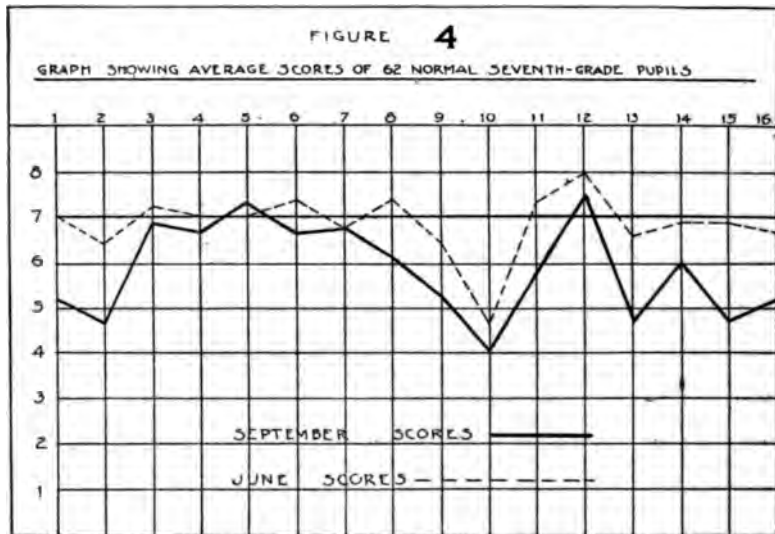


In Figure 1 the solid line shows the curve of Scott, a twelve-year-old, fifth-grade boy in one of the Sandwich schools, at the beginning of the year. The high and low points are more pronounced than in most cases. The solid lines in Figures 2 and 3 are the September curves of two other pupils drawn at random from among the cards of the Madison and Tamworth schools. All three of these pupils are normal or above according to the Otis Group Intelligence Scale. The broken lines in these figures are the end-of-the-year curves.

It will help in the understanding of the figures to take the case of a particular child. Consider the record of Paul (Figure 3). His score in the September test for rate of silent reading was 62. The third-grade score for rate of silent reading is 60. Accordingly, this boy showed third-grade ability in rate of silent reading in the first test. The first point on the solid line is therefore located at the intersection of the third-grade line with the vertical line No. 1. In the June test Paul's score for rate of silent reading



was 97. Since 97 is midway between 92 and 102, the standard scores for the sixth and seventh grades respectively, the first point on the broken line is located about half way between the sixth- and seventh-grade lines on the vertical line No. 1.



Similarly, in the first test his score for comprehension was 12, which is somewhat below the fourth-grade standard. His score on the second tests, however, was quite equal to the standard of the seventh grade.

The reader's attention is directed to the fact that in all the accompanying figures there is a tendency for the valleys and peaks of the curve for the June test to flatten out toward the horizontal. This represents the effect of the measures taken in these figures in the interim between September and June.

It will be noted that these pupils stood high in the four fundamental operations of arithmetic (Numbers 3, 4, 5, 6, and 7) and in Greene's English Organization Test (Number 12), which is mostly a test of general intelligence. In arithmetical reasoning or problem-solving (11), spelling (8), and language (14), they were near to grade standards. In rate (1) and comprehension (2) of silent reading, in rate (9) and quality (10) of handwriting, in visual vocabulary (13), and in the content subjects (15 and 16) each of these pupils ranked from low to very low.

The graphs of 72.24 percent of all the *normal* pupils above the third grade showed the same tendencies to a greater or less degree.² Figure 4 is a sort of composite graph of all the normal seventh-grade pupils in the district. They numbered 62. Figure 5 is a similar graph for the 104 normal fourth-grade children. These graphs were obtained by averaging the scores of the pupils in each separate subject and using the grades corresponding to the averages to locate the points on the graphs. For example, at the September test the average seventh-grade score for rate of silent reading was 95.2. This is a little above the standard fifth-grade score of 93. Hence the first point on the solid curve in Figure 4 is located just above the fifth-grade line. Similarly, the average of all the seventh-grade scores in comprehension of reading was 17.8. Since this is about two-thirds of the way from the fourth-grade standard toward that of the fifth grade, the second point is located two-thirds of the way between the fourth- and fifth-grade lines.

Having observed in the graphs these general tendencies of which I have spoken, I next made a survey of the time-tables and teaching methods in vogue in the district in order to formulate reasonable hypotheses to account for the conditions thus revealed and in order to aid in planning remedial measures.

The universally high scores in all the tested phases of arithmetic were indicative of over-emphasis on this subject. The

² In making this study the cards of all children who ranked below normal according to the intelligence tests were thrown out.

time-tables showed the relatively large amount of time assigned to arithmetic. The idea seems to be prevalent among teachers, pupils, and parents that arithmetic is the all-important subject. These schools are no doubt typical of the schools in small rural communities. Moreover, being widely scattered, they have little communication with each other. It would seem, therefore, that the results of this study fairly represent conditions in most of the smaller rural schools where standardized tests have not been used and where their diagnostic values have not been realized.

I am aware that these findings are contrary to those of more eminent workers who have found arithmetic to be a subject in which pupils usually grade low when measured by standardized tests. Possible reasons for this difference may be (1) that the results from *all* the pupils were considered instead of only the normal ones and (2) that their tests were given in city schools.

This over-emphasis on arithmetic in the smaller rural schools is not an unnatural condition. In fact there are sound reasons for it. In the first place, arithmetic is easier for the untrained teacher to teach than the content subjects. Fair results can probably be obtained with less mental effort on the part of the teacher in the teaching of arithmetic than in the teaching of history and geography. The work is largely a matter of drill, and drill is easy for the teacher. In the second place, teachers usually have more immediately obvious success in the teaching of arithmetic. It is human nature to like to do the things in which we best succeed. In the third place, pupils like arithmetic (a) because they enjoy good lively drill work in the fundamentals; (b) because they do not feel quite so much "at sea" in preparing an assignment of the next ten problems in arithmetic as they do in facing an assignment of the next ten pages in history or geography or physiology; and (c) because children like puzzles. The older pupils especially enjoy solving the problems of this character which our textbooks abundantly supply. In the fourth place, when it is left to the children to divide their study time among the different school subjects—as has been the common custom in unsupervised rural schools—an undue amount of time will usually be spent on arithmetic. Not knowing what to do with improperly assigned lessons in the content subjects, but knowing that they must keep busy at something, children will

turn to their arithmetics with which they feel most capable of doing independent work. Finally, the demands of parents on the teacher that their children be "learnt how to figger" is another factor in the situation. All these reasons cooperate in bringing about over-emphasis on arithmetic in the rural schools.

As the beginning of an attempt to remedy this condition we decided to reduce for a while the time devoted to arithmetic by one-half and to use the time thus gained for subjects in which the schools were making a poor showing.

Arithmetic was the only school subject in which there appeared a general tendency to rank very much above grade. The only other markedly high spot in the graphs was that denoting their grading in Greene's English Organization Test. In this test the pupils demonstrate their ability or lack of ability to rearrange broken sentences so as to make sense. Here is a sample of the disarranged sentences of which the test is composed:

wanted, to go home, him, the dog

Since this is largely a test of intelligence, the prevalent high scores of the pupils simply go to show that their low ratings in subjects other than arithmetic were not due to lack of mental ability, a fact also supported by their scores in the Otis Group Intelligence Scale.

The average scores for problem-solving in arithmetic were close to grade standards for each grade. The reason why the pupils did not do as well in this particular phase of arithmetical ability as they did in fundamentals will be discussed a little later. Spelling and language are other subjects in which drill work figures very prominently. Although on each of these two subjects there were wide differences between the lowest and highest scores in each grade, the averages were well up to or above standard, as shown by the solid lines in Figures 4 and 5.

Writing averaged the lowest of all the subjects in every school but one. The teacher of this school had received business college training and was good in muscular-movement penmanship. The low averages in writing led me to make a special investigation of the methods of teaching that subject in the district. A round of observation convinced me not only that the teaching of writing was being neglected but also that what teaching there was had little value. The copy-book method was in use in every school

except the one mentioned above. The teachers in general did not know how to teach writing. Therefore they had little success with it and did not like to teach it. Upon inquiry as to how the writing period was conducted, I learned that in several cases at least the teacher would simply tell the pupils to take their writing books and write for ten minutes. During this time she would sit at her desk and correct papers. At the end of the period, without even looking at the copy books she would tell them to put away their writing materials and go on with other work. In very few of the writing periods that I observed personally was there any adequate attempt to teach the children how to write. Is it strange that the writing scores were disgracefully low? I wonder if this condition is typical of schools in smaller rural communities with untrained teachers or is it a specialty of this district?

In an attempt to remedy the condition I tried to arouse the teachers to its seriousness, and I introduced a method of business writing into all the schools. This was somewhat of a venture since most of the teachers had had no training in muscular-movement writing. However, they were all informed regarding the correspondence course for teachers conducted by the publishers of the system, and were encouraged to take it. Several of them did so, and by the end of the year they were doing passable work as teachers of the new method.

As a result of this radical change the writing conditions in the schools are now in a somewhat chaotic condition. It takes time to break up the old finger-movement habits and perfect new ones. Hence the graphs show little improvement in writing scores for the year. We hope, however, that during the coming year a continuation of our efforts will produce definite improvement in the quality of handwriting.

The chief difficulty seems to be to get the children to use the muscular movement outside of the period of writing drill. Hereafter, in order to further our efforts, no written work will be accepted unless it is done with muscular movement. We believe it is largely a waste of time to compel a pupil to write with muscular movement for ten minutes a day and then to let him use finger movement in writing his compositions.

The reading scores were also scandalously low. Both the individual graphs (Figures 1, 2, and 3) and the grade graphs

(Figures 4 and 5) exhibit this fact in a striking manner. Analysis of the situation furnished several quite probable reasons for the poor showing in silent reading.

First, the pupils had not been taught silent reading. The reading drill in the schools was, and always had been, oral. Only two or three of the teachers had any conception of what is meant by silent-reading drill. The oral reading was conducted in the old-fashioned way which needs no description—and mostly in a slipshod manner at that. The fact that the children were tested for silent reading when all their class work had been in oral reading was probably the chief reason for the low scores.

Second, in most of the schools there was only one set of readers for each grade. The younger pupils knew most of the stories in the upper-grade books from hearing them read over and over by the older pupils. The fact that they knew the gist of these stories long before they ever reached the grades in which the books were used, that they had “studied” the lesson over several times at their seats (perhaps), and that each pupil was provided with a book in class, precluded any chance for real, live interest in the class drill. Many of the teachers, even, did not seem to be over-enthusiastic.

Third, the low scores resulting from the use of Thorndike's Visual Vocabulary Tests indicate that lack of word knowledge probably accounted to a large degree for the poor results in reading. It may well be that the narrow range of reading, due to lack of variety in books and to the conspicuous absence of school libraries, was responsible for the limited reading vocabularies of the children.

In the light of the above described conditions the low scores in content subjects need little explanation. Success in history, geography, etc., depends on ability to study effectively. Efficient study is efficient silent reading. Even in arithmetic, much if not most of the difficulty encountered by the pupils in solving problems lies in their inability to read and understand them as they appear in the text. Poor ability in silent reading, then, helps to explain why the scores in the problem-solving phase of arithmetic were so much lower than those in the fundamental operations.

These matters were brought to the attention of the teachers. They readily concluded that reading is the most important sub-

ject in the school, because upon it depends success in most of the other subjects. We therefore decided to give reading a place in the program commensurate with its importance. For the rest of the year most of the reading time was devoted to intensive drill in silent reading. Different methods of conducting this drill were devised in order to furnish variety and in order to keep interest alive. Much of the work in geography, history, physiology, civics, etc., was taken up as class drill in silent reading. Oral quizzes every few days by way of review in these subjects took the place of the customary daily question-and-answer recitation. In this way the time usually available for reading drill was quadrupled.

Did so much reading drill get monotonous? The children will testify that it did not. Did the content subjects suffer from giving up so much seat study and question-and-answer recitation? The graphs clearly indicate the answer.

We adopted also a definite policy of vocabulary building. New words were constantly introduced to the pupils by psychological methods. They were introduced as the names of ideas after the ideas themselves had been vividly brought to their attention by objects, pictures, or lively descriptions.

The number of reading books in the schools was multiplied by ten or twelve, and a generous beginning of school libraries was made. For the most part the new books were informational rather than merely entertaining. Yet they were books that appeal to children—and, indeed, they did appeal to them. Our difficulty now is not in getting the pupils to read but in getting them to do anything else but read.

What did it all amount to? Well, look at the broken lines in the preceding figures. They speak for themselves. They are the graphs of the same pupils and the same grades at the end of the school year.

PROVISION IN THE HIGH-SCHOOL CURRICULUM FOR CORRECTING PHYSICAL DEFECTS

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The course of study in physical education for secondary schools may be constructed to provide general physical training, or to include both general and specific training for the correction of defects. Of these the first is the current objective which has been approached through athletics and gymnasium exercises of a general sort. The second and more specific approach has been less used; yet is equally capable of use and is in some respects of greater importance.

In order to construct a course of study in physical education with provision for definite corrective work and in order to put it into operation in the school, four things are necessary. There must be: first, setting of standards of normality so that deviation from them may be measured; second, determination of the most serious defects common in the high-school population; third, collection of correctives; and fourth, provision of administrative machinery so that the school program may permit those having common defects to be taught at the same time.

In the Country Day School, a preparatory school for boys, of Kansas City, Missouri, these problems have been attacked. Definite standards for each age from 12 to 20 inclusive were obtained for standing height, sitting height, weight, chest girth, expansion, grip of right and grip of left hand. The standards for standing height, sitting height, weight and chest girth were taken from Porter.¹

Those for expansion and right and left grip were obtained by the measurement of 250 boys of each age in central Missouri schools.

All these standards were tabulated by ages and then arranged into percentile divisions, as shown in Tables I to VII inclusive.

¹ Porter, W. Townsend, "Growth of St. Louis school children," *Transactions of the St. Louis Academy of Science*, 6:248 ff., 1893.

TABLE I. STANDING HEIGHT (IN INCHES)

Percentile	Rank	Age								
		12	13	14	15	16	17	18	19	20
95	1	58.9	61.3	64.1	67	68.3	69.7	71.6	74	74.2
90	2	57.8	60.4	62.6	66.1	67.3	68.9	70.8	73	73.5
80	3	56.7	58.8	61.3	64.3	66.3	67.9	69.9	72.5	72.5
70	4	55.8	57.8	60.3	63	65.1	67	68.7	72.3	72.3
60	5	55.2	57.1	59.3	61.9	64.2	66.1	67.9	71.9	71.8
50	6	54.5	56.4	58.6	61.1	63.4	65.3	66.8	70.4	71
40	7	53.8	55.6	57.6	60	62.7	64.6	65.9	69.3	70.7
30	8	53.2	54.9	56.9	59.1	61.6	63.7	65	68.5	70.3
20	9	52.4	54	56	58.1	60.6	62.8	64.1	67.8	70
10	10	51.4	52.8	54.9	56.5	58.8	61.7	63.3	66.5	69.9
5	11	50.6	51.7	53.9	55.4	57.6	60.9	62.4	65.6	68.8

TABLE II. SITTING HEIGHT (IN INCHES)

Percentile	Rank	Age								
		12	13	14	15	16	17	18	19	20
95	1	31	31.8	33.6	34.8	35.9	37	37.3	38.4	39.6
90	2	30.3	31.1	32.6	34	35	36.3	37	37.9	39.3
80	3	29.7	30.5	31.7	33.3	34.1	35.4	36.6	37.2	39.1
70	4	29.3	30	31.1	32.5	33.7	35	36	36.5	38.9
60	5	28.9	29.8	30.6	31.8	33.2	34.6	35.2	35.8	38.5
50	6	28.6	29.3	30.1	31.3	32.7	33.9	34.5	35.2	38.1
40	7	28.2	28.9	29.8	30.8	32.2	33.6	34.2	34.8	37.8
30	8	27.9	28.5	29.5	30.3	31.4	33.1	33.9	34.4	37
20	9	27.5	28.1	29	29.8	30.9	32.4	33.6	34.1	36.9
10	10	26.9	27.5	28.2	29.2	30	31.4	33.1	33.3	35.2
5	11	26.6	27	27.7	28.6	29.3	30.6	32.2	33	34.4

TABLE III. WEIGHT (IN POUNDS)

Percentile	Rank	Age								
		12	13	14	15	16	17	18	19	20
95	1	91.1	104.2	118.7	132.6	147.7	142.7	156	167	169
90	2	86.2	95.4	110.7	125.6	140.5	140.6	150	160	163
80	3	81.2	89.7	102.9	117.3	129.7	136.2	146	155	159
70	4	78.2	85.5	96.7	110	125.1	132.5	142	149	155
65	5	75.6	82.2	92.3	105	119.9	125.7	137	144	150
50	6	73.5	79.7	87.9	100	114	121.6	134	139	144
40	7	71.3	76.6	84.7	94.9	108.9	119.4	131	135	140
30	8	68.7	73.9	81.6	90.3	102.8	115.5	128	130	137
20	9	66.1	70.7	78.5	85.8	98	112.8	124	124	132
10	10	62.8	67	74	81.5	87.7	104.3	119	121	128
5	11	60.4	64.4	70.4	78.6	82.9	99.9	112	117	125

TABLE IV. CHEST GIRTH (IN INCHES)

Percentile	Rank	Age								
		12	13	14	15	16	17	18	19	20
95	1	30	31.1	32.5	34	35.4	35.4	36	36.8	39.3
90	2	29.3	30.4	31.7	33.2	34.5	34.8	35.5	36.3	38.7
80	3	28.6	29.4	30.7	32.2	33.2	34	34.7	35.7	38.4
70	4	28	28.8	30.2	31.4	32.6	33.4	34.4	35.2	37.6
60	5	27.6	28.4	29.4	30.8	32	32.7	34	34.8	37.1
50	6	27.2	27.9	28.8	30.2	31.4	32.3	33.6	34.1	36.5
40	7	26.8	27.5	28.4	29.7	30.8	31.9	33.2	33.4	36
30	8	26.4	27	27.9	29	30.1	31.3	32.9	32.9	35.4
20	9	25.9	26.6	27.3	28.5	29.3	30.7	32.1	32.5	34.9
10	10	25.2	25.7	26.6	27.6	28.2	29.7	31.4	31.8	34.4
5	11	24.7	25.1	26	26.9	27.3	27.9	29.5	31.4	33.6

TABLE V. EXPANSION (IN INCHES)

Percentile	Rank	AGE								
		12	13	14	15	16	17	18	19	20
95	1	3.1	3.8	4	5.1	4.9	5.1	5.3	5.7	6
90	2	3	3.7	3.8	4.7	4.7	4.9	5.1	5.4	5.6
80	3	2.8	3.5	3.7	4.6	4.5	4.6	4.9	5	5.3
70	4	2.6	3.2	3.5	4.2	4.1	4	4.4	4.8	4.9
60	5	2.3	2.8	3.1	3.6	3.8	3.4	4.1	4.3	4.5
50	6	2.2	2.5	2.6	3.4	3.2	3	3.7	4	4.4
40	7	2.1	2.3	2.4	3	2.8	2.9	3.2	3.8	4.3
30	8	2	2.2	2.3	2.6	2.4	2.5	2.8	3.5	4.1
20	9	1.8	1.9	2.1	2.3	2.3	2.3	2.1	3.3	3.8
10	10	1.6	1.6	1.8	2	2	2.1	2	3	3.6
5	11	1.3	1.5	1.6	1.8	1.9	1.9	1.9	2.8	2.9

TABLE VI. RIGHT GRIP (IN KILOGRAMS)

Percentile	Rank	AGE								
		12	13	14	15	16	17	18	19	20
95	1	60	61	68	100	104	118	122	138	150
90	2	59.5	60.1	62.9	82	94	116	120	135	148
80	3	57	58	60	73	88	114.2	118	129.1	145
70	4	54	55	58	64	87	113.3	116.3	127	143.2
60	5	51	51.7	56	59	84.6	111.1	114	125.6	141.1
50	6	49.1	49.3	49.7	55	83.9	109.6	111.4	118.4	140
40	7	44	45	46	49.1	82	107	108.2	115	136
30	8	42	42.4	42.7	47	78	105.1	105	112.3	134
20	9	41	41.2	41.3	44	76.1	104	102.2	109.1	128.2
10	10	38	38.4	38.5	42	75	99.8	98.2	102.7	118.9
5	11	36	36.5	36.5	40	74	97	96	100.4	116

TABLE VII. LEFT GRIP (IN KILOGRAMS)

Percentile	Rank	Age								
		12	13	14	15	16	17	18	19	20
95	1	59	59.8	67	99.2	102	115	120	133	148
90	2	57	58	62.6	80.1	94	113.4	119	130	146
80	3	54	54.3	60	70.9	86.3	112	118	126.8	144
70	4	52	51	58	62	86	110	116	124.3	142
60	5	49	49.9	55	58	82	108.9	113	118	139.2
50	6	48	48.9	49.4	53.7	82	107.2	110	114.4	137
40	7	44	45	44	48.8	80	104.6	106.8	109.4	134
30	8	42	42.2	42.5	46	78	101.9	104	106	130.1
20	9	41	41	41.2	43	76	101	100	104	124.3
10	10	38	37.9	38	41.8	74.8	98.1	98	101.5	117.2
5	11	36	36.4	36.4	39	74	95	94	100	115

The 95-percentile indicates the upper limit of rank, the 90-percentile, rank two, and so forth; so that in giving a student his standing he was told only that he was in rank one, or two, or whatever his measurements justified, thus obviating technical nomenclature.

The division of standards into percentiles is of the greatest importance for corrective purposes. Obviously, if the median is set as the standard, then any student above median will feel that he has reached standard and does not need to improve, while any student who is very low may be discouraged because of his failure to reach standard immediately. The provision of many standards is vital in stimulating the student to try for the next rank above, whether he be below or above the median. The steps are comparatively short and so easily made that the encouragement that comes from obtaining the next higher stimulates enthusiasm and effort.

In addition to the measurements mentioned, other items for which less definite standards are necessary were included. These were bad posture, under-developed legs, under-developed arms, abnormal heart, uncleanliness, bad teeth, adenoids, chronic throat trouble, deformed feet, and eye strain. These are important, but may be recognized by the examiner without the use of a close standard—such as is advisable for expansion or grip.

Perfection in these seventeen items constitutes the objective toward which the corrective exercises were directed according to the standards for each age.

It is obvious, of course, that some of the defects (such as low sitting or standing height) would not be directly and in isolation amenable to correction. Indirectly, however, and in combination with other weaknesses, even these defects may be improved. Likewise, some of the defects, such as adenoids, would be given medical attention; it being the function of the physical director merely to call attention to the need. The range of corrective gymnastics should include all defects between those not attacked directly and those yielding only to medical treatment.

At the Country Day School, pupils' defects were determined each year by examination. The primary examination occurred in September; and, in order to record progress, re-examinations were made in January and in June. Data cards, one of which is shown, were provided for each student.

These cards were used by the physical director and by the boy himself for reference and record. In addition, they were used in a more general way to provide the material for compilations which served to arouse and maintain the interest of the whole school in the undertaking. For example, there were compilations of especially notable measurements of individuals, of high averages, of comparative ranks by classes, teams, and ages. The competitive instinct was played upon frankly. If interest lagged, new material appeared upon the bulletin board. By comparisons with other schools and in various other ways the strengths as well as the weaknesses of this particular school population were brought forward. While this necessitated considerable work, particularly at the time of the January and June re-examinations, the results justified it.

Table VIII indicates in a general way the improvement noted in the year and a half immediately following the introduction of the system into the Country Day School.

A very material climbing into the higher ranks will be noticed between the September examinations of each school year and the next later re-examination. It will be noticed, too, that while the September, 1918 percents are better than those of September, 1917, they are not as high as those of June, 1918. This

SAMPLE OF DATA CARD

COUNTRY DAY SCHOOL

PHYSICAL EXAMINATION

Student A. B.
 Age 15
 Class Sophomore
 Year. 1917-18

	September		January		May	
	Units	Rank	Units	Rank	Units	Rank
Standing height (in.)	71.4	1				
Sitting height (in.)	38.2	1				
Weight (lbs.)	146.5	1				
Chest girth. (in.)	34.	1				
Expansion (in.)	4.	5				
Right grip (kg.)	90.	2				
Left grip (kg.)	84.	2				
	Aver.	2	Aver.		Aver.	

Posture

Under-developed legs

Under-developed arms Corrected Jan.

Heart

Uncleanliness

Teeth

Adenoids

Throat

Eyes

Feet Ingrown nails. Corrected Jan.

Remarks Permit all athletics. Place in Class
 C. gymnasium to correct arms.

E.M.T. Examiner.

was due, not to retrogression during the vacation months, but to
 the induction of new boys into the school.

TABLE VIII. IMPROVEMENT IN PHYSICAL CHARACTERISTICS, SEPTEMBER, 1917-JANUARY, 1919

	September 1917	June 1918	September 1918	January 1919
Percent of boys who ranked 3 or better.....	38	44	42	43
Percent of boys who ranked 6 or better.....	65	78	87	93
Percent of boys who ranked 9 or better.....	91	97	92	96
Percent of boys who ranked below 9.....	8	2	7	3

The provision of correctives for the defects discovered by examination is a comparatively simple matter. This knowledge is common in physical education literature, and the physical director is already acquainted with it. It is sufficient here to say that the development of any given part of the body, and the correction of flat feet, postural faults and similar defects are directly and surely influenced by physical training; while the digestive, nervous, and circulatory systems are little less directly and surely capable of being influenced.

But a more serious task is the provision of a program which will permit special attention to small groups. This attention to small groups is vital if the best corrective work is to be done. For example, it will be found advisable to provide a curriculum such that separate classes in physical training may be available first for normal boys (Class A); second for boys who are organically and mechanically sound but who have poor general musculature (Class B); and third for three different sections of boys in need of special corrective attention (Class C). For Class A boys the usual athletics may be used, if care be taken to remember that a normal boy is not necessarily a perfect one, and that normality may not maintain itself always. For Class B boys, athletic games are beyond doubt needed for their general development, but there are difficulties. If they were greatly interested in athletics they would not be Class B boys, so usually it will be found wise to put them into a special gymnasium class while

starting their development, and by fostering a real liking for athletics, enable them to go on for themselves when compulsion is withdrawn.

In Class C, three sections will be found advisable. In one will be placed those boys who are incapacitated for usual exercise forms, boys with flat feet, subnormal heart, very poor expansion, or crippled permanently or temporarily. This section should never care for more than ten pupils, and in general, not more than one in forty will be found belonging here. The second section will include most boys with postural faults, those needing especially development of the shoulders, chest, and arms. In the third section may be placed boys in need of specialization in the development of legs, torso (including digestive corrections), and those extremely fat or extremely thin. These two sections need not be limited in numbers.

The reason for the necessity of these divisions is that otherwise each boy in a given class spends one-third of his time correcting his own defects and two-thirds of his time doing work to correct defects which he does not have.

No sacrifice of academic schedule and no added cost are necessary in order to provide for a course of study in physical education such as is needed. It is only necessary to arrange the program before beginning the work, in order to coordinate the physical and academic schedules.

The curriculum suggested is written without any attempt to lay down a *school* curriculum. Only those parts of it which relate to physical education are advocated. The academic subjects are chosen more or less at random, the only care taken being to see that the number of subjects listed corresponds to the number which is usual in high-school courses of study.

As to the time schedule, that one is purposely chosen into which it is hardest to fit physical education work. The schedule of the day is taken to include forty-five minute periods, beginning at nine o'clock and continuing until four, with an hour for lunch. The tendency is away from this schedule, but if the right kind of courses in physical education can be fitted into this old schedule they can be fitted into any.

Three points are to be kept in mind. First, provision is to be made for the various divisions previously mentioned. Normal

students and those in need of corrective work cannot with safety be put into the same classes. Second, provision is to be made for holding some of the physical education classes during the school day. Unless this is arranged, part of the needed instruction cannot be given; the work loses caste by becoming purely an after-school activity; the physical director, who is supposedly a specialist, must either remain idle or be used to teach other subjects in which he may or may not be expert; and an expensive gymnasium and plant remain idle during much of the time. Third, physical and academic schedules must be coordinated to further the best interests of both.

Keeping these things in mind and using the nine to four school day, the following curriculum for a four-year high school is suggested.

FRESHMAN YEAR

<i>Required</i>	<i>Elective</i>
Mathematics I	Modern Languages I
English I	Classical Languages I
History I	Music
Beginning Gymnasium	Athletics
Practical Hygiene	Military Training

SOPHOMORE YEAR

<i>Required</i>	<i>Elective</i>
Mathematics II	History II
English II	Classical Languages II
Gymnasium	Modern Languages II
	Music
	Manual Training
	Science
	Athletics
	Military Training

JUNIOR YEAR

<i>Required</i>	<i>Elective</i>
Mathematics III	History III
English III	Classical Languages III
At least one physical education elective	Modern Languages III
	Music
	Science
	Agriculture
	Manual Training
	Military Training
	Athletics
	Advanced Gymnasium

SENIOR YEAR

<i>Required</i>	<i>Elective</i>
English iv	Mathematics iv
At least one physical education elective	History iv
	Classical Languages iv
	Modern Languages iv
	Music
	Agriculture
	Science
	Athletics
	Manual Training
	Military Training
	Advanced Gymnasium

It is, of course, understood that individual schools will have their own regulations regarding certain of these electives whether required singly or in groups. Whatever these conditions are, it is maintained that a school can continue to use the usual four major subjects and the usual minors and still have room in the curriculum for a real course of physical training.

Practical hygiene takes up only three periods a week; the military training, if given, two periods a week, plus a Saturday morning session, which many schools omit as unnecessary. Athletics come after school hours; and the remaining work fits into the schedule without friction. Not even a curtailment of study periods, which would be justified if needed to keep a boy fit, is necessary. Three sample programs show proof of this.

SAMPLE PROGRAMS

I. FRESHMAN BOYS. CLASS C. CORRECTIVE

Period	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9-9:45.....	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	Military?
9:45-10:30....	Gym	Study	Gym	Study	Gym	Military?
10:30-11:15...	English	English	English	English	English	
11:15-12.....	Study	Study	Study	Study	Study	
12-1.....	Lunch	Lunch	Lunch	Lunch	Lunch	
1-1:45.....	Latin	Latin	Latin	Latin	Latin	
1:45-2:30.....	Study	Study	Study	Study	Study	
2:30-3:15.....	History	History	History	History	History	
3:15-4.....	Hygiene	Military	Hygiene	Military	Hygiene	
4-5:30.....	Athletics	Athletics	Athletics	Athletics	Athletics	

II. SOPHOMORE BOYS. CLASS A. NORMAL

Period	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9-9:45.....	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	Military?
9:45-10:30...	Study	Study	Study	Study	Study	Military?
10:30-11:15.	Gym	Boxing	Gym	Boxing	Study	
11:15-12....	English	English	English	English	English	
12-1.....	Lunch	Lunch	Lunch	Lunch	Lunch	
1-1:45.....	History	History	History	History	History	
1:45-2:30...	Study	Study	Study	Study	Study	
2:30-3:15...	French	French	French	French	French	
3:15-4.....	Study	Military	Study	Military	Study	
4-5:30.....	Athletics	Athletics	Athletics	Athletics	Athletics	

III. JUNIOR BOYS. CLASS B. POOR GENERAL MUSCULATURE

Period	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9-9:45.....	English	English	English	English	English	Military?
9:45-10:30...	Study	Study	Study	Study	Study	Military?
10:30-11:15.	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	
11:15-12....	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture	
12-1.....	Lunch	Lunch	Lunch	Lunch	Lunch	
1-1:45.....	Study	Study	Study	Study	Study	
1:45-2:30...	French	French	French	French	French	
2:30-3:15...	Gym	Study	Gym	Study	Gym	
3:15-4.....	Mech. D.	Military	Mech. D.	Military	Mech. D.	
4-5:30.....	Athletics	Athletics	Athletics	Athletics	Athletics	

The course of study in physical training, except in cases where the school is so large that sections of classes must be duplicated, is such that it may be handled by one man.

IV. TEACHER'S PROGRAM OF PHYSICAL WORK FOR HIGH SCHOOL

Period	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9-9:45.....	Corr. Gym 1		Corr. Gym 1		Corr. Gym 1	Military?
9:45-10:30...	Corr. Gym 2	Tumbl.	Corr. Gym 2	Tumbl.	Corr. Gym 2	Military?
10:30-11:15.	Adv. Gym	Boxing	Adv. Gym	Boxing	Adv. Gym	
11:15-12....	Begn. Gym	Wrestling	Begn. Gym	Wrestling	Begn. Gym	
12-1.....	Lunch	Lunch	Lunch	Lunch	Lunch	
1-1:45.....						
1:45-2:30...	Corr. Gym 3		Corr. Gym 3		Corr. Gym 3	
2:30-3:15...	Class B Gym		Class B Gym		Class B Gym	
3:15-4.....	Hygiene	Military	Hygiene	Military	Hygiene	
4-5:30.....	Athletics	Athletics	Athletics	Athletics	Athletics	

This program, as it stands, may be lightened by the removal of military, and may, in a given year, not need all the corrective sections.

THE RETENTION OF FOREIGN LANGUAGE IN THE HOME

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The solution of the problem of Americanization is largely dependent upon the early acquisition of English by the newly arrived immigrant as his ordinary medium of communication. Whatever strides he may make in other directions toward an understanding of the ways and customs of the land of his adoption, the newcomer can hardly be said to be ready for the assumption of the duties of a citizen of this republic until he is decidedly familiar with the new language. Accordingly, in order that he may secure the necessary familiarity with English, the utmost time and effort of directors of Americanization are employed to the end that the immigrant may be given the privileges of schools for children and adults in the daytime or the evening. Even with these agencies, the question is not entirely settled as to what constitutes a real command of language or what would indicate true assimilation of it by the foreign-born.

Teachers of language are pretty well agreed that a proper command of a foreign tongue is not acquired until the student finds himself thinking in the new medium. If this be accepted as a reasonable test of the immigrant's assimilation into the new national life, what may be considered some of the visible signs and outward manifestations of such ability? Probably the natural answer would be to say that the whole question may be summed up in the statement, "Habitual use of English in the everyday affairs of life." Unfortunately, the ordinary affairs of life involve a number of diverse factors—the life of the store and the workshop, the life of the street and the country, the life of the church and the lodge, the life of the recreation hour, the life of the home. Of all these the last is probably closest to being the ultimate test. Here outside restraints are laid aside and the family meets on the most natural and unconstrained basis. Accordingly, the tendency to "think aloud" is more nearly realized in the home than elsewhere. Moreover, it is here that the real influences of day, eve-

ning, and continuation schools are most directly felt and applied. If the proper inspiration has been given in the classroom, the home will become the laboratory for the practice of the new acquisition. Freed from the fear of ridicule or the danger of reprimand, the family will use the meal time or the evening recital of the events of the day as an opportunity to practice the English language. Thus it will soon become in reality the vehicle of thought, and the first and most important step toward assimilation will have been taken. On the other hand, if the language of the fatherland continues to be the medium of communication at home, not only is a great educational opportunity overlooked by the newcomers, but by the maintenance of the foreign atmosphere in the home the real adoption of the United States as a new homeland is deferred, and, it is to be feared, sometimes permanently prevented. The experience of the past three years has given ample demonstration of the fact that such conditions exist to a far greater degree than had before been supposed.

Many still feel, however, that such unfortunate conditions are to be found principally in the congested districts of our largest cities, especially on the Atlantic seaboard, and in the scattered colonies known as "Little Russias" and "Little Italies" which are found throughout the land. They feel that in the majority of communities where the foreign element is not predominant and the general tendency is to patronize the public schools, no very serious result will follow even if the older members of the family do for a time after their arrival in this country continue to speak the foreign tongue at home. In such communities the principal burden is laid upon the school. The supposition is that, while the parents must use English in their commercial pursuits, the pupils will become so accustomed to using it in school and at play, that they will continue to speak English at home. Thus, it is assumed that without any very conscious or special effort the whole family will shortly find itself using English to the total displacement of the foreign tongue. Unquestionably, this has happened in a number of instances and communities. But there is good ground to believe that, even where the public school has been an important factor in the community, the persistence of the foreign language is much more stubborn and widespread than has been suspected. A recent investigation by the writer has thrown considerable light

upon the situation and gives food for thought to those who have been disposed to stress too greatly the involuntary transfer of the influence of the school into the home, as well as to those who have felt that continued residence in an Americanized community is in itself an earnest of assimilation.

In connection with a study,¹ made during the years 1918-1919, of the relationship existing between nationality and progress of children in school, the writer investigated the cases of 2,584 parents of children of foreign extraction attending the public schools of Minneapolis and St. Paul. Those children were included in the study whose parents or grandparents were born outside of the United States. In almost all cases the children themselves were native born, and to insure as far as possible that they had been in a school environment long enough to escape the supposed retarding influence of the foreign language in the home, children from only the sixth, seventh, and eighth grades were studied. Among other questions each child was asked: "What language does your father speak at home?" "What language does your mother speak at home?" "What language, besides English, can you speak?" "What language, besides English, can you understand?" "How long has your father been in the United States?" "Your mother?" The birthplace of father, mother, and child were requested. In considering the results, one must remember that these were public school children in schools where English had been continuously the language of instruction; that they were children at least eleven years of age; and that they were interrogated during the period of the war when the tendency to indicate use of English at home would have been greater than at any other time.

Table I gives in the first column the total number of parents of each nationality studied; in column 2, the number who speak English as the language of the home; and the third column gives the percent of column 2 to column 1. The fact that the Germans head the list in acquisition of English is partially explained by the fact that there was a tendency to a refusal to answer the questions or to answer falsely on the part of German-speaking

¹ Jordan, R. H. *Nationality and school progress*. Bloomington, Illinois: Public School Publishing Company. (In press.)

TABLE I. COMPARATIVE TABLE OF NATIONALITIES, SHOWING NUMBER AND PERCENT OF FOREIGN-BORN PARENTS WHO HAVE ADOPTED ENGLISH AS THE LANGUAGE OF THE HOME

Nationality	Total Parents	Number Speaking English	Percent Speaking English
Bohemian.....	36	6	16.6
Slovakian.....	77	5	6.5
Norwegian.....	396	128	32.3
Swedish.....	802	265	33.0
German.....	201	123	61.2
Austrian.....	126	10	7.9
Danish.....	63	26	41.3
Finnish.....	86	1	1.1
Roumanian Jew.....	234	35	15.0
Russian Jew.....	526	45	8.5
Italian.....	37	3	8.1

TABLE II. PERSISTENCE OF FOREIGN LANGUAGE SHOWN BY NUMBER AND PERCENT OF FOREIGN-BORN PARENTS WHO RETAIN THE FOREIGN LANGUAGE AS THE HOME LANGUAGE, ALTHOUGH THEY HAVE LIVED IN AMERICA TEN YEARS OR MORE

NATIONALITY	TOTAL PARENTS	YEARS LIVED IN THE UNITED STATES					
		10 to 19		20 to 29		30 and more	
		Number	Percent	Number	Percent	Number	Percent
Germany.....	201	14	7.0	9	4.4	22	10.9
Danish.....	63	5	7.9	7	11.1	5	7.9
Norwegian.....	396	69	17.4	48	12.1	76	19.2
Swedish.....	802	93	11.6	166	20.7	134	16.7
Austrian.....	126	30	23.8	23	18.2	12	9.5
Roumanian Jew.....	234	123	52.6	18	7.7	5	2.1
Italian.....	37	5	13.5	16	43.2	3	8.1
Bohemian.....	36	6	16.6	10	27.7	10	27.7
Slovakian.....	77	22	28.5	20	25.9	18	23.3
Russian Jew.....	526	237	45.0	145	27.5	32	6.1
Finnish.....	86	38	44.1	23	26.7	14	16.2

children. In two cases the child replied: "I don't want to tell!" How far this affects the result is a question. In the mind of the writer the effect would not be very great, probably not great enough to displace the German group from its position of primacy. The entire significance of the table is not understood until it is studied in connection with Table II. Here again we have in column 1 the total number studied; in column 2 the number who have lived in this country from ten to nineteen years, inclusive, and who still speak the foreign language at home; column 3 shows the percent of these to the total; columns 4 and 5 give the same data for those who have lived in this country from twenty to twenty-nine years, inclusive; and columns 6 and 7 for those who have lived here thirty years or longer. Figures 1 and 2 show graphically the same facts as Tables I and II.

When we note that only one Finn out of 86 uses English as the home tongue and that 75 of these Finns have lived in this country ten years or longer, we must confess that the influence of the general environment of the public school and of the social and commercial requirements of the city have not been extremely effective since they have permeated the home to no greater extent than is indicated. In the same way the tables show that 5 of 77 Slovaks speak English at home, although 60 of the 77 have lived here at least ten years; and that of 802 Swedes 393, or 49 percent have lived here ten years, but speak Swedish at home. The last column of Table II is even more significant. When 28 percent of the Bohemians, 19 percent of the Norwegians, 17 percent of the Swedes, 11 percent of the Germans have lived in this country 30 years or longer—most of them continuously in a predominantly English-speaking community² with every opportunity to acquire the new language—and when these families have not felt the need of using English at home, the conclusion is forced that a much more vital factor is required than has been applied in the past in order to secure this basic element of Americanization. Some individual cases are even more startling: two Swedes, one German, one Finn, and one Russian have lived in this country fifty years and still speak the foreign language in the home circle!

² The United States census of 1910 showed that 28.5 percent only of the population of Minneapolis and 26.3 percent of the population of St. Paul were foreign-born.

Six Norwegians and five Swedes have been here forty-five years or more but do not speak English at home.

In Table III a still more serious situation is found, for this table gives the data for 125 parents who were themselves born in this country, but who speak the foreign language as the home medium.

TABLE III. DISTRIBUTION OF PARENTS BORN IN THE UNITED STATES WHO SPEAK A FOREIGN LANGUAGE HABITUALLY AT HOME

Nationality	Father Only	Mother Only	Both	Total Parents
Bohemian	1	6	0	7
Slovakian	0	4	0	4
Norwegian	3	14	6	29
Swedish	7	19	9	44
German	2	8	5	20
Finnish	2	4	2	10
Russian Jew	2	2	0	4
French Canadian	3	4	0	7
Total	20	61	22	125

In nine Swedish families, six Norwegian, and five German, both parents were born in the United States but do not speak English at home! The tendency of the mothers to make the language of their mothers the domestic language is shown by the greater number of the native-born mothers who use the foreign language, than of the fathers. The potent factor in most of these cases is the presence in the home of a foreign-born grandfather or grandmother who has never learned English; but this factor certainly should not go farther than to make necessary a type of bilinguality which is in large part excusable. The comparative influence of the mother in determining the home atmosphere is brought out very definitely by this table. The whole situation is more clearly presented to us when cases of individual homes are examined. In one case, a Norwegian-born husband married an American-born wife, and although the husband has lived here for 35 years, both speak Norwegian in the home circle. Another case is exactly similar save that the husband has been here but

29 years. An American-born husband, of American-born parents married a Norwegian-born wife; he speaks English at home but, despite her thirty years' residence here, his wife clings to Norwegian as the home tongue. Another American-born husband is more complaisant; and since his Swedish-born wife in her thirty-four years' life here has not acquired English, he also speaks Swedish at home. A Norwegian-born husband has a Scotch-born wife; he has lived here for 45 years but both of them speak Norwegian at home. A Swiss husband has been here 31 years, and his Austrian wife for 28 years; they speak German as the fireside language. An Irishman married a Minneapolis-born girl whose father was born in France and whose mother was born in Germany. He speaks English at home, but she speaks German. In two out of three cases where a Swedish husband has a Norwegian wife, Swedish is spoken at home, but in the third case, the wife was dominant, and they have "compromised on Norwegian."

Thus, under the very favorable situation existing in Minneapolis and St. Paul, only from 20 to 25 percent of our immigrants have adopted English as the home language and more than one-half have not come to use English at home after living here for ten years or longer. The result of the foregoing study is to show that if this is true, the need for a new method of attacking the problem is manifest, or we shall have a growing tendency to continue the foreign language even to the later generations of the native born. The problem is probably not one primarily of the public school. Very probably it should fall rather under the general head of the problems of Americanization and of naturalization, and so rather become a social and legislative matter.

Legislative and other methods of insuring that English be the language of instruction in all schools will surely help to solve the problem, but the study sets forth clearly that there is a further need to be met. More carefully drawn naturalization laws will be in part effective. Equal suffrage, in bringing to many of the immigrant women the desire to acquire the rights of citizenship, will be in time a strong element in forcing many women to learn the new language. A changed attitude on the part of pastors and editors toward their foreign-born constituencies must also be effected. Sermons preached in English and local papers printed in English will have a powerful effect.

By way of summary, it may be said that if the condition pointed out in the above study is to be met effectively, it must be done by the development of a social consciousness on the part of the immigrant. He must learn that to be a good citizen of the new homeland he must speak English at home, attend sermons preached in English, and read papers printed in English. All of these things must be considered as a prerequisite to his ability to cast his ballot in an American election—a privilege which should stand to him as the crowning attribute of citizenship, the final proof of his complete assimilation as an American.

GROUP INTELLIGENCE TESTS AS A MEANS OF PROGNOSIS IN HIGH SCHOOL

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In this article data are submitted showing the possibilities of using the Alpha Army Intelligence Test as a means of prognosis in high school. This test was given to about one and a half million men in the army and became available for public use at the close of the war. It consists of eight sub-tests, and the maximum possible score is 212. The scores were interpreted by the army psychologists as follows:

Score	Rating	Interpretation
135-212	A	Very superior intelligence.
105-134	B	Superior intelligence.
75-104	C+	High average intelligence.
45- 74	C	Average intelligence.
25- 44	C-	Low average intelligence.
15- 24	D	Inferior intelligence.
0- 14	D-	Very inferior intelligence.

The conclusions of the present study are based on the results obtained from the high schools at Madison, Wisconsin; Rockford, Illinois; and Sioux City, Iowa; and from three high schools at Omaha, Nebraska, namely, Central, Commerce, and South. The test was given at Madison, Rockford, and Sioux City in May, 1919 and at Omaha during the second semester of the year 1919-1920. The total number of students taking the tests in these six high schools was 7,168, distributed as shown in Table I. The conclusions are summarized in the remaining tables.

According to Table II, which relates only to the results secured at Madison, Rockford, and Sioux City, only 8 students of the 3,703 tested fell below a score of 45 or "average intelligence." These eight were all in the freshman and sophomore classes. This indicates that more than average intelligence is necessary to enable students to enter these high schools. This agrees with the conclusions of Dr. Terman in his discussion of the "Significance of

TABLE I. THE NUMBER OF STUDENTS BY SCHOOL, CLASS, AND SEX ON WHICH THE STUDY IS BASED

	MADISON	ROCKFORD	Sioux City	OMAHA			TOTAL
				Central	Commerce	South	
Senior boys	62	111	69	128	63	22	455
Senior girls	103	149	141	152	82	47	674
Junior boys	80	166	88	151	97	28	610
Junior girls	141	183	162	190	147	46	869
Sophomore boys ...	121	186	135	184	133	33	792
Sophomore girls ...	175	182	192	235	217	49	1,050
Freshman boys	140	235	208	280	268	84	1,215
Freshman girls	174	265	235	331	379	119	1,503
Totals	996	1,477	1,230	1,651	1,386	428	7,168

TABLE II. SCORES OF THREE HIGH SCHOOLS (MADISON, ROCKFORD, AND SIOUX CITY) IN THE ARMY GROUP TEST ALPHA BY SEX AND CLASS

SCORE	RATING	Boys					Girls					GRAND TOTAL
		Senior	Junior	Sophomore	Freshman	Total	Senior	Junior	Sophomore	Freshman	Total	
135 and over	A	120	129	89	56	394	120	134	80	33	367	761
105-134	B	88	141	208	205	642	206	257	234	219	916	1,558
75-104	C+	30	60	119	258	457	63	92	207	323	685	1,152
45- 74	C	4	4	25	61	94	4	3	27	96	130	224
25- 44	C-	0	0	0	3	3	0	0	1	3	4	7
15- 24	D	0	0	1	0	1	0	0	0	0	0	1
0- 14	D-	0	0	0	0	0	0	0	0	0	0	0
Totals		242	334	442	583	1,601	393	486	549	674	2,102	3,703

Various Intelligence Quotients"¹ where he says, with reference to average intelligence in terms of the Stanford-Binet tests, that "the high school, however, does not fit their grade of intelligence as well as the elementary and grammar schools." The high-school students are thus seen to represent a relatively high grade of intelligence. From Table III it will be seen that selection of the mentally superior continues through the four years of high school. Thus, according to the medians, seniors stand higher than the juniors, the juniors surpass the sophomores, and the sophomores outrank the freshmen. This is true for the sexes separately as well as for the classes as a whole. This means that a large number of high-school students are eliminated because they lack the mental ability to meet the requirements of the work offered. How to provide for the individual capacities is, of course, a problem school administrators have worked on for many years. With the perfection of intelligence tests we may hope that the problems will become easier to solve through knowledge of the degree of intelligence required for success in the various types of school work.

TABLE III. COMPARISON OF MEDIAN SCORES IN THE ALPHA ARMY TEST IN SIX HIGH SCHOOLS BY SEX AND CLASS

	MADISON	ROCK-FORD	SIOUX CITY	OMAHA		
				Central	Commerce	South
Senior boys	130.0	129.3	140.8	143.0	113.1	126.7
Senior girls	117.9	119.8	134.7	132.5	109.7	104.5
Whole class	121.2	123.8	137.6	135.0	110.8	110.0
Junior boys	124.0	124.6	136.2	134.0	108.0	118.8
Junior girls	121.4	112.2	128.0	130.5	97.8	117.8
Whole class	122.4	119.7	130.2	132.0	101.8	118.3
Sophomore boys . . .	114.4	108.7	125.5	125.0	99.5	107.1
Sophomore girls . . .	104.4	104.7	118.7	121.0	88.9	118.5
Whole class	109.7	107.0	122.1	122.0	93.8	113.6
Freshman boys	100.0	94.1	111.6	107.0	85.4	102.1
Freshman girls	93.0	89.8	105.0	107.0	84.0	87.5
Whole class	96.0	94.0	107.9	107.0	84.5	92.9

¹ Terman, Lewis M. *The intelligence of school children*. Boston: Houghton Mifflin Company, 1919.

It will also be observed that according to Table III significant differences appear in the median scores made by the students of the six high schools. In an earlier study,² the writer remarked on the superiority of scores made in the Sioux City high school over the Madison and Rockford scores. No satisfactory explanation was found. In this table striking differences are also shown between the three Omaha high schools: Central ranking first, South ranking second, and Commerce ranking third. In order to throw further light on this situation, the writer made a comparison of the occupations and nativity of the parents of the students of these three high schools. By "parent" is meant the father if living; the mother, if the father is dead; and the guardian if both parents are dead. The results appear in Tables IV and V. The occupations were classified in the following manner: (1) professional: artists, clergymen, engineers, lawyers, physicians and dentists, teachers; (2) business: bankers, builders and contractors, manufacturers, real estate; (3) public service: city, county, state, and other officials; (4) trades: bakers and confectioners, butchers, machinists, printers, etc.; (5) clerical: bookkeepers, salesmen, etc.; (6) personal services: agents, boarding housekeepers, hotel employees, housekeepers, milkmen, peddlers, seamstresses, street railway employees, etc.; (7) laborers: liverymen, teamsters, unskilled labor; (8) unclassified: occupations not given.

TABLE IV. COMPARISON OF OCCUPATION OF PARENTS OF THE STUDENTS OF THE OMAHA CENTRAL, SOUTH, AND COMMERCE HIGH SCHOOLS

	CENTRAL H. S.		COMMERCE H. S.		SOUTH H. S.	
	Number	Percent	Number	Percent	Number	Percent
Professional	226	11.1	43	3.8	33	6.0
Business men	754	35.6	274	23.0	116	20.4
Public service	74	3.5	47	4.0	14	2.5
Trades	227	11.1	228	19.2	32	6.0
Clerical	184	8.6	113	9.5	14	2.5
Personal	413	19.6	278	23.5	67	12.0
Laborers	48	2.5	93	8.0	88	16.1
Unclassified	169	8.0	118	9.0	192	34.5
Total	2,095	100.0	1,194	100.0	556	100.0

² Madsen, I. N. and Sylvester, R. H. "High school students' intelligence ratings according to the Alpha army test," *School and Society*, 10:407-10, October 4, 1919.

TABLE V. COMPARISON OF NATIVITY OF PARENTS OF THE STUDENTS OF THE OMAHA CENTRAL, SOUTH, AND COMMERCE HIGH SCHOOLS

	AMERICAN BORN		FOREIGN BORN	
	Number	Percent	Number	Percent
Central High School.....	1,519	71	617	29
Commerce High School...	692	51	669	49
South High School.....	329	59	227	41

It will be seen from Table IV that there is a distinct difference in the constituency of the three high schools, Central High drawing more largely from the upper and middle classes, South High ranking second in this respect, and Commerce ranking last. Central is the oldest high school of the city and is of the classical type. Commerce, as the name indicates, provides training in commerce and other vocational courses. South High is the smallest of the three and is a cosmopolitan school but with about half of its students in commercial and vocational courses. From Table V it will be seen that there is also a distinct difference in the nativity of the parents of the students of the three schools, Central having the smallest proportion of foreign-born parents, South ranking second, and Commerce third. These facts again point to the serviceableness of the Army test as a measure of intelligence. There is substantial agreement between the intelligence scores of the high-school students and their social origin.

A very significant fact appears from Table VI, namely, the superiority of the younger students in each class over the older students in the same class. Thus the median score for the twelve-year-old freshmen is 125.0, for the thirteen-year-old freshmen, 109.7, etc., with a substantial and consistent decrease in score with increase in age to a score of 50.0 for the eighteen-year-old freshmen. The same fact holds for the other three classes. This is exactly what would be expected if the Alpha Army Test really measures native intelligence. Logically, one would expect a twelve-year-old who has reached the freshman class to be mentally superior to the older students in the same class. The difference cannot be due to educational experience for the twelve-year-old

TABLE VI. COMPARISON OF MEDIAN SCORES IN THE ALPHA ARMY TEST BY AGES AND BY CLASSES IN THE MADISON, ROCK-FORD, AND SIOUX CITY HIGH SCHOOLS

	AGE								
	12	13	14	15	16	17	18	19	20
Freshman.....	125.0	109.7	103.3	97.2	90.3	87.0	50.0	.....	.....
Sophomore.....	.....	125.0	121.9	114.4	113.3	103.7	105.0	95.0	.....
Junior.....	.....	.....	130.0	128.7	127.3	121.5	114.1	100.0	.....
Senior.....	.....	.....	.....	145.0	141.4	130.3	125.8	117.8	107.5

TABLE VII. CORRELATION OF INTELLIGENCE WITH SCHOOL MARKS IN THE SOUTH OMAHA HIGH SCHOOL

	<i>r</i>	Number of Students
Freshman boys.....	0.27	84
Freshman girls.....	0.37	119
Sophomore boys.....	0.42	33
Sophomore girls.....	0.36	49
Junior boys.....	0.38	28
Junior girls.....	0.50	46
Senior boys.....	0.51	22
Senior girls.....	0.36	47

has ordinarily not been in school as long as his older classmates. The likelihood is much stronger that the reverse is true. The older freshman has also the advantage of more years in which to secure incidental information, which should help him in making a high score if educational experience is a factor. Another significant fact appearing from Table VI is that for any given age there is an increase in score by the sophomores over the freshmen, by the juniors over the sophomores, and by the seniors over the juniors. For example, for age fifteen, the median score of the freshmen is 97.2; of the sophomores, 114.4; of the juniors, 128.7; and of the seniors, 145.0. This also accords with the logic of the situation.

If the Army test really measures intelligence, then for a given age, the students in the higher classes would secure the highest scores.

Table VII shows the correlation of intelligence with school marks. The school marks were obtained from South High School by taking the average of each student's marks at the end of the first semester, 1919-1920. Pearson's formula was used for finding the coefficients of correlation. It will be seen that the correlations are all positive and large enough to be significant. Several reasons may be given why they are not larger. In the first place, the inaccuracy of school marks as shown by recent investigations would reduce the correlations below their true value. A second cause is the shifting standard of marking. The standard tends to be too high where intelligence is unusually high and too low where it is unusually low. This is inevitably the case where marking is based on the normal distribution curve for the particular school.

TABLE VIII. NUMBER OF SUBJECTS CARRIED BY SOUTH HIGH-SCHOOL STUDENTS WHO BELONGED TO THE LOWEST AND HIGHEST QUARTERS OF THEIR CLASSES (ACCORDING TO THE ARMY TEST)

SUBJECT	TAKEN BY FRESHMEN		TAKEN BY SOPHOMORES, JUNIORS, AND SENIORS	
	Highest Quarter	Lowest Quarter	Highest Quarter	Lowest Quarter
English.....	50	40	42	39
French.....	6	4	9	2
History.....	22	14	16	21
Latin.....	19	7	21	11
Mathematics.....	20	9	16	17
Spanish.....	7	1	2	0
Penmanship and spelling..	22	34	.....	.....
Physics.....	.....	.....	14	9
Reviews.....	.....	.....	5	10
Shorthand.....	.....	.....	12	14
Typewriting.....	.....	.....	19	27
Chemistry.....	.....	.....	7	3
Cooking.....	.....	.....	7	11
Commercial arithmetic....	.....	.....	10	15

Table VIII also indicates a correlation between intelligence and school work. The question occurred to us whether there would be any differences in subjects chosen by the students scoring high and those scoring low in the army test. To determine this, the students scoring above the upper quartile and those scoring below the lower quartile were compared. For this purpose the students of South High were used. The freshman class was scored separately and the three upper classes were combined because of the smallness of their numbers. In the freshman class there were 50 students (21 boys and 29 girls) in the highest quarter of the class, and of course the same number in the lowest quarter. In the three upper classes there were 60 students (25 boys and 35 girls) in the superior group and also in the inferior group. There appears to be a marked tendency for the superior group in both cases to select the subjects usually considered "hard," and for the inferior group to select vocational or prevocational subjects. This tendency is prevented from full expression by certain fixed requirements and by the lack of "sophistication" among the students. How shall we interpret these facts? Does intelligence tend to seek its proper level? Do the mentally superior select the more academic subjects because they find them mentally "stimulating" or because of college and professional preparation?

Persistent and important sex differences are found in scores made in the Army mental tests. In every one of the six high schools, the median score for boys in each class was higher than the median score for girls in the same class. (See Table III.) This sex difference has also been found consistently in universities where the test has been given. Two reasons have been proposed for this difference: first, that the boys are really mentally superior, and second, that the Army test is a "man's test." The latter reason has been asserted particularly with reference to Test 8. This is a test of general information; and it appears to be more within the range of the interests of men than of women. In order to determine the extent to which each of the eight tests contributed to the differences in total scores, the median score for each test and for the boys and girls of each class at the High School of Commerce was found. The results appear in Table IX.

In connection with this table the reader's attention is called to the following titles or descriptions of these eight tests:

1. Comprehending and carrying out directions
2. Arithmetical problems
3. A test of common sense
4. Opposites test
5. Disarranged sentences
6. Number completion test
7. Judgment of relationship
8. General information test

From Table IX it appears that the greatest difference was in Test 8. The boys, however, surpassed the girls to some extent in every test except the fifth (disarranged sentences). Although the boys did better than the girls in the Army test, it appears from Table X that the girls in each class had the highest school marks. It is quite possible that certain emotional traits resulting in greater docility enable the girls to secure better marks on a smaller mental capital than the boys need. These emotional traits need not be elaborated upon here since they are familiar to teachers and educational students through educational psychology.

TABLE IX. SEX DIFFERENCES IN TESTS 1 TO 8 OF THE ALPHA ARMY TEST IN THE OMAHA HIGH SCHOOL OF COMMERCE
(MEDIAN SCORES)

Class and Sex	Test								Number of Students
	1	2	3	4	5	6	7	8	
Freshman boys..	9	10	9	12	8	8.5	13	18	268
Freshman girls..	7	9	8	11	10	8	14	16	379
Sophomore boys.	9	11	9	14	11	10	18	22	133
Sophomore girls.	8	9	9	13	10	9	16	18	217
Junior boys.....	9	12	10	15	11	10	16	23.5	94
Junior girls.....	7	9	10	14	12	9	16.5	21	147
Seniors boys....	8	12	10	18	12	10	19	26	63
Senior girls.....	8	9	11	18	14	10	19	22	82

TABLE X. COMPARISON OF MEDIAN SCORES IN INTELLIGENCE AND IN SCHOOL MARKS IN THE SOUTH OMAHA HIGH SCHOOL

Class and Sex	Intelligence Scores	School Marks
Freshman boys.....	102.1	77.5
Freshman girls.....	87.5	83.3
Sophomore boys.....	107.1	80.3
Sophomore girls.....	118.5	86.0
Junior boys.....	118.7	82.5
Junior girls.....	117.8	86.6
Senior boys.....	126.7	86.9
Senior girls.....	104.5	85.5

To conclude, the present study may be summarized as follows:

1. High-school students are a highly selected group mentally compared with the general population. "Average intelligence," as defined by the army psychologists, was the lowest grade of intelligence in the high schools investigated.

2. Selection by elimination of the mentally inferior continued throughout the four years of high school.

3. In each class the younger students were superior mentally to the older students; and accordingly, at a given age, students in upper classes were superior mentally to those in lower classes.

4. Students whose parents were in the "higher" and more remunerative occupations, and were of American nativity were mentally superior to students whose parents followed the more undesirable occupations and were of foreign nativity.

5. The correlation of mentality with school marks was positive.

6. There was a difference in the subjects of study elected by the mentally superior and the mentally inferior.

7. Sex differences were indicated by a higher median intelligence score for the boys than for the girls.

8. In each class the girls, in spite of lower intelligence scores, had higher school marks than did the boys.

To the writer, it seems that facts like these should help high-school principals in their problems of prognosis and guidance. The group intelligence test does not, of course, displace other means of doing this. However, it provides a quick and serviceable way of getting at one of the most important factors in the success of a student in his school work, namely, his intelligence.

AN EXPERIMENT IN ARRANGING HIGH-SCHOOL SECTIONS ON THE BASIS OF GENERAL ABILITY

ERNEST P. BRANSON

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In October and November, 1919, some nine hundred pupils in the eighth grades of the Long Beach, California schools were tested with the Otis Group Intelligence Scale. Since half of these pupils were to enter high school the following February, it was decided to select in advance two classes in high-school English partly on the basis of the test scores. These two high-school sections will be known as Sections A and D. Section A was composed of those younger pupils whose Otis scores were high. Section D was composed of those older pupils whose Otis scores were low. The average age in Section A was 13.6 years; in Section D, 14.7 years. The average score in Section A was 143.5; in Section D, 93.5.

Both sections were given to the same teacher without any hint as to difference in ability. In less than a week the teacher had noticed it and had reported it to the head of the department and to the vocational adviser. Since we had previously agreed to wait until the teacher showed that she was aware of the difference before revealing that an experiment was in progress; it was now time to take the teacher into our confidence. At the end of the second week in the high school each of the two groups was tested with the Holley Sentence Vocabulary Scale, Series 3B. The teacher was told to proceed with the work of the term, adapting it to the capacity of each section according to her judgment.

At the end of the term the same test was given again without announcement in advance. The test is one of general language ability and correlates well with general intelligence. It consists of the words embodied in incomplete sentences, which are to be filled out by the choice of one of four suggested words.

In the teacher's opinion the groups were better social groups because of the similarity of ability. Instruction was easier than it would have been if the groups had been mixed. Indeed the only difficulty in instruction lay with the poorer class; and this was largely because the teacher lacked definite knowledge as to how much she could change the course of study and yet make it

possible for these pupils to take regular work in later terms. The effect on individuals was good, some in the better section making their first apparent effort. The teacher could judge on this point as she had previously been the departmental English teacher of a number of them. The brighter ones when matched with their equals apparently found effort worth while. It may be pointed out here that the usual class contains enough average and dull pupils to quench the fire of some who possess unusual ability.

In Section D, fourteen pupils were present throughout the experiment. All of these had been assigned in accordance with the teacher's judgment. In Section A, twenty-two pupils were present for the entire period. The teacher felt that three of them had not been satisfactorily assigned. One was a somewhat retarded pupil; the other two were suspected of being temperamentally unfitted for successful school work. The test results confirm the suspicion. Each section contained other misfit pupils who were assigned to these sections by the exigency of crowded rooms, not as part of the experiment.

The assignments on the basis of test results were more satisfactory in the case of the poorer section, despite the fact that a poor score may be due to an accidental factor such as illness or fatigue. The assignments to the better section were not quite as satisfactory to the teacher, though the high scores of pupils in this section could hardly be due to an accidental factor.

But why did these pupils of apparently superior ability fail to take hold of the work as well as the rest of the section? This question is related to one that appears when the results of the first and second vocabulary tests are compared. The losses in the scores of individuals are most noticeable in the case of those who made very high scores the first time. It seems that the superior pupils were less dependable in school routine. The first test was a novelty; and they did their best. The second time a little less effort lowered the scores a bit. The Pearson coefficients of correlation confirm this view. The correlation between the first and second tests was 0.85 for Section D and 0.67 for Section A.

While rating presented no problem in Section A, in Section D grades were given as follows: 1 student received A; 3 students received C; 10 students received C—; 5 students received D. "C—" means credit granted on condition. The condition for these

RESULTS AS SHOWN BY THE HOLLEY SENTENCE
VOCABULARY SCALE

SECTION	MEDIAN		LOWEST SCORE		HIGHEST SCORE		CORRELATIONS	
	First Test	Second Test	First Test	Second Test	First Test	Second Test	First and Second Vocabulary Test	Otis and First Vocabulary Test
D	48	49.5	33	38	66	64	0.85	0.30
A	63	66.5	47	55	79	79	0.67	0.41

pupils was that they enroll in a designated section for the next semester, Section D being held together in this way. This solution of the granting of credit for the necessarily inferior work done and this method of holding the class together is not wholly satisfactory, but it is the best upon which the teacher, head of the department, vocational adviser, and registrar found themselves in agreement. The principal of the high school humanely insists that it is wrong to put the C—stigma on the efforts of these pupils. They should be saved that sense of failure.

Any estimate of the results of this experiment is a happy one compared with what must have happened to these pupils if scattered throughout the school. All the weaker pupils must surely have failed; discouragement would have caused them to leave school in most cases, for that is the history of poor ability—quick elimination from opportunity. As for Section A, the intellectual leadership of the next generation depends on giving the widest opportunity for development to those best fitted to lead.

Two thoughts occur to us as a result of our experience with these classes. First, the course of study should be examined with the needs of weak classes in mind. Definite modifications in subject matter and method should be made in order to fit a course of study to the needs and capacities of this group. Second, the granting of credits and the system of credit bookkeeping and program planning should be made as elastic as possible in order to aid these pupils to remain in school without the sense of failure. To do one's best is not failure.

Editorials

THINGS WE DO NOT KNOW

Nothing is better calculated to engender humility of spirit than conducting a reference department in an educational office. The Bureau of Educational Research of the University of Illinois has been offering this service; and the school people have proposed all sorts of questions, problems, and perplexities. Indeed, if we could give a corporate existence to the school people, we should say that they differ from the small boy when he cuts loose on his bewildered father only by being "more so." For example, Mary Smith—this is no *nom de plume*—wrote, "Will you please tell me how to make the teaching of Caesar more interesting?" At this juncture we were inclined to resign. So far as we are aware, the teaching of Caesar is not only uninteresting but intentionally, avowedly, and blatantly so. Its uninteresting character is indeed its alleged virtue. Nevertheless, we took the request quite seriously and so gladdened Mary's heart that her colleague, Alice, in the history department promptly wrote for "any information in regard to supplementary material for a high-school course in ancient history." Six months later Alice again appeared on the scene, this time as a geometry teacher, but with the same childlike faith in our omniscience.

Not exactly easy is the topic sent us by a committeeman who in a moment of weakness had evidently agreed to report to some organization on "Curriculum Reconstruction Due to the War." He passed the task on to us without subdivision or modification. Now, the curriculum without reference either to war or to reconstruction is sufficiently baffling. But as a problem for realignment because of the conditions and results of the world conflict, it becomes a quagmire crossed here and there by prints of human feet but devoid of paths which lead anywhere in particular.

But perhaps we were never more completely overestimated than when we received from the president of a woman's club a request for material on "The World: Its Problems and Its Progress"—all on a postal card. Considering the fact that this interesting proposal arrived when the world was decidedly wobbly and its progress altogether problematical, our correspondent has probably forgiven us for withholding complete information on her timely topic.

But not all the topics, nor indeed very many of them, have such an impossible scope. Some others, however, although they may be more precise and have greater dignity as practical questions, are nevertheless elusive. Not a few of them would make admirable topics for dissertations. For example, one writes, "We are to build a new community high-school building. We shall have \$100,000 to spend and shall need to provide for two hundred students in the future. We want plans of new buildings, lists of equipment, etc. We expect to provide courses in academic subjects, agriculture, domestic science, manual training, the sciences (biological, physical, and chemical), and commercial subjects. We also ought to have a gymnasium and if possible a swimming pool." The writer adds with sudden realization of the high cost of building, "We are probably too ambitious for our purse." Nevertheless, he has a definite problem; and he has done some thinking for himself. He states the conditions with clearness and vigor.

Again, a school board member, who is also a physician, writes: "Can you send me something in print which deals with the general subject of daylight illumination, particularly the questions of the proper amount (ideal, maximum, and minimum) of light to reach the child's school book, character, quality, and direction of source considered, also some information as to the amount of light reaching northern Illinois from the sky, direct sun rays not considered, both in clear and cloudy weather through the winter season?" This again is a topic of specific, practical character. It is also a topic concerning which we have little satisfactory information. Such a topic might engage the earnest and prolonged attention of students of physics and meteorology as well as of education.

The topics we have mentioned are incapable of being answered in the present state of our knowledge. Whether they are thoughtfully or uncritically expressed, they rest upon assumptions as to the availability of data which are not justified. Ways of making the teaching of Caesar more interesting are not matters of record. Successful teachers seldom leave behind them any footprints in the sands of pedagogy. Curriculum reconstruction can only be undertaken with great labor by many people working on a common problem from various points of view. Specifications for buildings and precise data on illumination have not been gathered in suffi-

ciently authentic detail to be helpful. We do not assert that these questions are either frivolous or impossible. The answers to them, however, are not at present in existence. They involve for their solution long and painstaking investigation and the cooperation of students in several fields of knowledge.

But other questions are received which are definite, practical, and obviously worth while. Yet in many cases answers to these questions are likewise unobtainable. For example, "Do you know of any standard of expenditures for school purposes, that is, whether or not anyone has estimated or determined what percent ought to be expended by school authorities for the various items under the topics of *general control, instruction, operating plant, maintenance, . . .* in the present system of accounting used by federal and state departments?" To obtain such facts for school systems of different sizes would require nothing more than the clerical service necessary to combine figures obtained from systems using the approved classification of accounts. Not only superintendents and boards of education but also the general public would be interested in knowing what they might be expected to expend for libraries, promotion of health, teachers' salaries, etc. in order to be up to the standard in such matters.

Another correspondent asks, "What is the standard rate of attendance?" This is apparently a simple question. All we need to do is to consult the reports of superintendents for the attendance rates in different localities, and by summarizing these we may arrive at a notion of the usual rate. As a matter of fact, however, there is no good answer to this question. It is one of the things we ought to know but do not.

Again, a superintendent wants to know the typical amount of retardation in cities of 100,000 or more. Another, thinking along the same line, wants to know the ages of eighth-grade graduates and of high-school graduates. Still another writes to ask what has been done to determine "what might be termed 'the legitimate percent of failures' among high-school pupils."

Perhaps we have said enough to indicate why we are humble. Although not all the questions we receive are worthy, far the greater part of them represent a real need on the part of somebody. Moreover, many of them are relatively simple; yet a surprisingly large number cannot be answered convincingly. Among the

subjects of masters' and doctors' theses, of educational monographs and articles, we do not find enough of the problems which are really confronting teachers, supervisors, and administrators. It would be infinitely to the advantage of educational inquiry if topics for research showed a closer relationship to the actual needs of the school. The fact that they do not—the fact that those who know the concrete problems are not doing the educational writing while too often those who write do not appreciate the problems—accounts for the astonishingly large number of *things we do not know*.

B. R. B.

EDUCATIONAL RESEARCH BY MEMBERS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

In the August (1920) number of the *Psychological Bulletin* Dr. Boring, secretary of the American Psychological Association, summarizes statistics on the research fields in which 393 members of the association report themselves to be working. The statistics include all the members of the association except a few who failed to report on this item. A member who reported two or more fields was accredited fractionally to each of the fields, which accounts for the fractions in the figures given below. Of the 393 reporting, 53 are carrying on no research. The remaining 340 are classified as follows in Table VI of Dr. Boring's article:

FIELD OF RESEARCH	NUMBER ACCREDITED
I. Non-psychological Fields	
1. Philosophy	15.7
2. Aesthetics	1.7
3. Anthropology	2.6
	<hr/>
	Total 20.0 or 5.9%
II. Chiefly Pure Psychology	
4. General psychology	8.7
5. Experimental psychology	81.6
6. Theoretical psychology	37.4
7. Animal psychology	15.5
8. Psychology and neurology	4.2
	<hr/>
	Total 147.4 or 43.4%

III. Social and Industrial Psychology

9. Social psychology	6.1
10. "Applied" psychology	10.7
11. Industrial psychology	7.4

Total 24.2 or 7.1%

IV. Chiefly Education

12. Tests	54.2
13. Educational psychology	43.9
14. Education (including experimental pedagogy)	13.2
15. Clinical psychology	13.7
16. Statistical method	1.2

Total 126.2 or 37.1%

V. Psychopathology

17. Abnormal psychology	7.2
18. Psychiatry	2.5
19. Psychopathology	7.0

Total 16.7 or 4.9%

VI. Miscellaneous

5.0 or 1.5%

Grand Total 339.5 or 99.9%

Although a classification like that attempted by Dr. Boring cannot be free from certain ambiguities, two important facts are tentatively established by his data:

1. When we combine the figures for the three fields of applied psychology (education, psychopathology, and social and industrial psychology) it is seen that this group accounts for 167.1 of the 340, which is 49.1 percent of the total number.

2. Approximately 37 percent of the 340 members of the American Psychological Association who are doing research work are accredited to the field of education. Surely the future of the JOURNAL OF EDUCATIONAL RESEARCH ought to be assured.

L. M. T.

A BOOK OF CASES

In their educational reading teachers are looking for things they can use. No doubt they often give too narrow an interpretation to the term useful, and we observe that, actuated by this impulse, they are subscribing in enormous numbers for periodicals devoted to devices most of which are shallow and inconsequential. Nevertheless this demand for things that will work has its meaning for investigators. It raises the question of a worthy substitute for the mere device.

To be more specific, we note that in connection with testing programs there has been some disappointment because the superintendent or the research director has so frequently failed to follow up the testing with a campaign of betterment. This has meant that many of the lessons of the testing have been lost. High hopes, entertained when the testing was begun, have not always been realized. In casting about for something concrete and vital to say to teachers on the procedure to be followed as a result of testing, we have become convinced that the form of reporting may be improved.

We commonly present our material in tables; and these tables constitute the framework of our discussion. Yet individual cases are entirely lost in tabular statements, unless the tables are very detailed—and in that case they are usually too long to print. A table of the usual type may indicate, for example, the number of ten-year-old children belonging to the fifth grade and having scores of 7 in addition, 40 in handwriting, etc. Such a table, however, does not permit us to express the characteristics and achievements of separate individuals. We cannot be sure that a single child actually exemplified in himself the conditions we have mentioned. A table, to the extent that it is a summary—and almost all printed tables are summaries—offers little upon which detailed practice can be based. Neither do the articles which are written around such tables. They are of general but rarely of specific application.

We, therefore, suggest as an especially useful type of material for the guidance of teachers the detailed reporting of cases. A "case" is a child with his recorded characteristics, antecedents, and achievements—a child who is attending school and who necessarily presents at various points in his school career problems which are met by some sort of procedure. The report of a case is

merely a descriptive and narrative biography of the child in question as he proceeds through school. It has something to say about his family and his personal traits, but more especially it is devoted to a chronicle of what was done by him and the teacher (or other official) and of what resulted from the action taken.

Our effort to secure practical data has forced us to the conclusion that far more useful than cheap devices and quite as dignified as most of our research would be a collection of reports of such cases, properly classified and indexed. In the practice of law this is precisely what is done. Good law is simply a case which applies to the matter in hand. Wigmore *on evidence* or Williston *on contracts* or any one of the various encyclopedias of law are essentially citations of cases, classified and indexed so that they can be applied to aid in the determination of almost any question.

The analogy between school cases, and court cases cannot, of course, be pressed too far. The legal case is more than a statement of conditions as revealed by the evidence. It also involves a decision by an authority of competent jurisdiction. Indeed the whole body of legal doctrine is based upon decisions rendered in actions before courts constituted for the express purpose of making decisions. The essence of the legal case, therefore, resides in the fact that something is decided. The school case, however, does not appear in an institution whose chief purpose is to render decisions. The school does other things, and when it makes a ruling, its ruling is by no means above dispute. Yet even in school the means are becoming available for reaching decisions—not merely decisions by constituted authority but decisions based upon impersonal standards whose applicability cannot easily be questioned. It is clear, therefore, that given the machinery for transmitting accounts of the cases and of the decisions rendered in them, a body of educational doctrine may be built up for the guidance of practitioners.

If, for example, we had as a beginning a thousand well-established and typical case reports, in each of which the salient facts about a child were given with the different crises that arose in his school career and the measures that were taken to meet them, we should no doubt have a body of material which in richness and in utility for schoolroom practice would quite exceed that of any book which has ever been published. This "Book of a Thousand Cases" would be a *vade mecum* for every teacher. In it would be

found the means by which resourceful teachers have coped with the difficulties of their craft. For there are really few if any new problems in teaching. There are new phases of old problems, but it is scarcely thinkable that at this late day any really new crux ever appears in a schoolroom. The overgrown and backward child, the child who is shy, the child who has a special disability in mathematics, the sullen and the sunny, the honest and the dishonest, the leader and the follower—all these have been attending school time out of mind. They have been coaxed or cudgled, stimulated or repressed, punished or rewarded. The point, however, is that the inexperienced teacher must meet all these conditions as if they had never existed before. To her the experience of her predecessors is nothing. She must tread the same path that others have trod, meet the same difficulties that others have met, fail or succeed for the same reasons that have influenced thousands of others. She has no guidance from them, no friendly lessons of caution from their mistakes, no inspiration from their successes.

Of course, one reason why there is little available concrete material of the sort which we have in mind is because the school, unlike the courts, have no systematic means of record-making. Most of our actions leave no deposit; and if any record is made of them, it is only for temporary use. As soon as it has served its immediate purpose, it is discarded and lost. For example, most teachers appear never to realize that they themselves—to say nothing of others—could make good use next year of the examination questions they make out this year. Very few teachers of our acquaintance have been able to give any intelligent estimate of the abilities of children one year as compared with another because their methods of testing pupils have passed out of their minds and have been unrecorded from year to year.

The case book of which we are speaking, the book which will bring concrete situations before the teachers who can profit by them, will rest for its publication upon systematic record-making in the classroom and school office—record-making which is a little burdensome, a little tedious, and altogether uninspiring. We venture to believe, however, that if this record-making could be developed even in a few centers, and if the first case book, edited, interpreted, classified, indexed, and cross-referenced, could once appear, it would justify by its usefulness every effort through which it was produced.

B. R. B.

Reviews and Abstracts

E. H. CAMERON, *Editor*

Arithmetic: report of progress. Duluth Public Schools, 1919.

The above report represents the course of study in arithmetic in the public schools in the city of Duluth. It was introduced in September 1919, having been constructed during the previous school year through the combined effort of teachers, principals and supervisors in the public schools and of representatives of the State Normal School of Duluth. While the principals, supervisors, and representatives from the normal schools were responsible for formulating the general principles underlying the course of study, much of the actual selection of the subject matter to be taught and its arrangement in the course of study represents the work of the teachers themselves. In fact, the contribution which the teachers have evidently made is one of the distinctive features of the report.

The report begins with a concise statement of the aims to be accomplished and the attitudes to be developed through the teaching of arithmetic—statements reflecting the social values in education. The brief outline of the subject matter composing the next portion of the report is the direct outcome of emphasizing the following aims: (1) to enable one to do the ordinary computing required in common business; (2) to give arithmetical knowledge that fits into the real situations of home, shop, farm or business; (3) to acquaint pupils with the simplest methods used in business. At all times the subject matter has been chosen upon the basis of the social and individual needs of the child.

After a brief survey of the subject matter of the course, comes another distinctive feature of the report—one usually lacking in courses of study—namely, a statement of general directions for classroom procedure and a discussion of the underlying principles in such procedure. This section of the report is very specific and suggests to the teacher just what to do in minute detail. These directions and principles contain almost all the scientifically established facts. Indeed, the section includes a quotation from "Principles of Method in Teaching Arithmetic as Derived from Scientific Investigation" in the *Eighteenth Yearbook of the National Society for the Study of Education*. The section closes with a brief discussion of the various standardized tests in arithmetic, giving a description of the tests and the standards of achievement.

The next section of the report is a detailed statement of the work of each grade, with special emphasis on the following heads: directions, subject matter and projects, optional work, standards of attainment and bibliography. Three things deserve special mention in this section. (1) The explicit directions suggesting to the teacher the proper method for dealing with the commonly overlooked things in teaching; (2) the elaborate description of a major project and a suggested list of minor projects. This portion of the report is in keeping with best educational thought and should be welcomed by all teachers interested in project teaching; (3) the detailed bibliography referring the teachers to the exact chapters which deal with the problems peculiar to the particular grade. The report closes with a well-selected bibliography on various aspects of the teaching of arithmetic.

In general this report represents the embodiment of our best modern theories of education and the inculcation of the best scientifically established principles. It is more than a course of study. It is an outline of methods as well—such a combination being made possible through the cooperation of specialists, administrators, and teachers. Other cities could well follow the example of Duluth. C. W.

Arithmetic survey in the public schools of Newark, N. J. Newark, New Jersey: Board of Education, December 1919.

This report presents the results of a survey of arithmetic in the Newark public schools, conducted in 1919 under the direction of Mr. Elmer K. Sexton, assistant superintendent in charge of the Department of Reference and Research. In this survey, the Woody Scales, Series B, and the Stone Reasoning Test were given. The giving of these tests and the scoring of the results deviate somewhat from the usual practice followed in surveys in that a teacher was sent to each school (in no case the school where she regularly taught) to give all the tests in that school and in that the test papers were scored by the staff of the Department of Reference and Research.

The reports set forth comparisons of results attained in Newark with those attained in other cities, comparisons of the achievements in various schools in Newark, comparisons of achievements of specialized groups of children, e.g., Italian and Hebrew children, children from prosperous American parents and those from less prosperous American parents, etc. The later sections of the report deal with the analysis of errors.

The most significant conclusions are:

1. The children of Newark surpass the Woody standards in all grades below va and fail to attain the standards in the higher grades. In this connection it should be said that recent investigations indicate that the original Woody standards upon which these comparisons are made are low in the lower grades.

2. The children of Newark make a high record in the Stone test, but not as high as the children of Salt Lake City.

3. That there is a high correlation between the scores attained in the fundamentals and in the reasoning problems. This correlation was not calculated and seems to be based upon class scores rather than upon scores of the individual pupils.

4. The Hebrew children surpass all others in the fundamentals but are excelled by the Americans in reasoning.

5. There is no significant difference between the results achieved by the children from the more prosperous and the less prosperous homes.

The report is very carefully worked out and should be very helpful to teachers and supervisors. It should be welcomed by those who have had little experience in testing for it represents the proper method of dealing with test results to make the measurements most worth while. It appears that the report would be more easily interpreted if there had been a greater utilization of graphic presentation.

C. W.

BARTHOLOMEW, W. E. and HURLBURT, FLOYD. *The business man's English*. New York: Macmillan Company, 1920. 340 pp.

This book forms an excellent introduction to the very many problems that arise in the use of English in business. It is in fact a course in business letter writing with several introductory chapters on matters of correct and effective English and with

some supplementary chapters on office practice, report writing, proof reading, and the like. The subject matter is authoritative and up-to-date, a first essential when one is dealing with such a changing thing as business practice. A great wealth of material is presented with striking conciseness, and yet with such an abundance of exercises that the classroom teacher will find the book a practical text. Every effort has apparently been made to make the sections on errors and correctness of English just as practical as possible, and in this respect the book is clearly superior to some recent texts on "applied" English. Such a book as this in high school furnishes a practical outlook that is the best and most powerful incentive for composition work, and it will be welcomed by teachers who are eager for better results in this direction. Of course, in any book which tries to cover an immense field, there is an inevitable loss of emphasis on what many would feel to be the more essential matters. This defect, however, any teacher can easily remedy simply by passing over certain parts and putting more time on others.

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E. W. DOLCH

HILL, DAVID SPENCE. *Introduction to vocational education*. New York: Macmillan Company, 1920. 475 pp.

In this volume Dr. Hill has done what needed very much to be done. He has brought together widely varying data and materials from widely diverse fields and has organized them into a study of vocational education.

A glance at the table of contents reveals an unusual breadth of treatment running all the way from "Safeguarding American Democracy" in chapter I, and "Adjustments to Individual and Society" in chapter III, through "Education for Mechanical Trades and Industries" in chapters VIII and IX, to "Applications of Psychology to Instruction and Industry" in the thirteenth and last chapter.

The author has very wisely incorporated the Smith-Hughes Act and the Smith-Sears Act in their entirety in the Appendix.

Following each chapter is a very complete list of references selected with discrimination and with full appreciation of the needs of that particular chapter.

The book will make its chief contribution as a reference for libraries, as a help to students of education, and as a source of information to the lay reader who is interested in the newer phases of the modern school.

University of Illinois

S. J. VAUGHN

MACKIE, RANSOM A. *Education during adolescence*. New York: E. P. Dutton and Company, 1920. 189 pp.

This volume, as the author freely acknowledges, is based upon the work of G. Stanley Hall. Some seventy different citations to Dr. Hall's writings are made in support of the theses presented. A plea is made for the junior high school, the elective principle in secondary education with a definite leaning toward vocationalism, a certain irreducible number of constants—English, social studies, history—and a new procedure along the lines of the socialized recitation. The book contains copious quotations from exponents of the principles of self-activity as opposed to a lifeless formalism and uniformity in educational practice. Typical curricula for the junior and senior high schools are discussed.

The author, being an ardent disciple of Dr. Hall, accepts without question and with enthusiasm the theory of saltatory development. Upon this hypothesis is worked out

an argument for the junior high school. Those who urge the theory of gradual development would be inclined, no doubt, to challenge a program that would impose upon later childhood a school in which the pupils: (1) "Need much drill, habituation, authority, and memory work;" and then suddenly offer a school for pre-adolescents (12 to 15) in which pupils are to have a "New Freedom" because (2) "As adolescence slowly supervenes and boyhood is molted, the method of freedom and appeal to interest and spontaneity should be increased. If there is any genius or talent, enthusiasm for work or ideals, they begin to be felt." (Cited by the author as a basic principle from Dr. Hall's *Youth: Its Education, Regimen and Hygiene*, p. 359.)

The striking thing in this contrast is not the desirability of the new school with its new procedure for the junior high-school boys and girls, designed to *release* personality and *unfold* individuality under freedom regulated by law, but rather in the denial of a similar emancipating program for later childhood, or for that matter, any other administrative unit in the whole range of education. It does not seem to be a valid or valuable theory of education that would restrict one period of education (whether later childhood or that of college after the high school) by imposing a rigid formalism—a memorizing, lesson-hearing school, and then attempt to find a "Path to Freedom" in some subsequent period. Pupils of later childhood may be so badly corrupted in the lesson-hearing school that a procedure for *releasing* personality cannot be economically and productively developed in the subsequent period.

Another major criticism is offered not because the author does not make a good case for a certain group of "constants" in secondary education—English, social studies, history—but rather because he, in common with a number of writers, is failing to give proper emphasis to other major fields of secondary education, particularly science and mathematics, as basic work for all pupils in our secondary schools. Certainly the technic of our modern civilization is science. The tools of science are comparatively new. In order to understand and appreciate the problems of our modern life, and in order to build our civilization—socially, economically, nationally, internationally—the people of a democracy must be familiarized with the tools and the method of science. There is abundant argument to support the view that science should be a universally known and appreciated as the English language itself. It is not enough to say that only a limited number of trained experts will be required. There is no way of selecting them in advance of the experiment. Moreover the common man needs to know what his specialist is about, and to appreciate expert and trained leadership. Science, including mathematics, is a definite and an invaluable contribution toward a common knowledge and toward a general appreciation of American life.

The proper development of the physical sciences requires secondary school mathematics. No "hit and miss" election of such an important subject can be defended.

With a rational development of the project method, and socialized procedure, the constructive arts may gain a commanding emphasis in the secondary school among the "constants." At all events, it does not seem wise to foster a dogmatic or limited view of any irreducible minimum. The tendency to emphasize a few common courses of studies is a definite reaction against a growing practice of loose and uncoordinated election.

The author reflects the well-known attitude of Dr. Hall toward the foreign languages, particularly the classical group.

As a whole, this volume is a stimulating challenge. Material of current interest is assembled and the writer defends his theses with enthusiasm.

*University High School,
Madison, Wisconsin*

H. L. MILLER

Bibliographies

SELECTING A PLAY

DRAMA LEAGUE OF AMERICA. *List of plays for high school and college production, edited by committees from the Drama League and the National Council of Teachers of English.* Washington, D. C. (306 Riggs Building): Drama League of America, 1916.

DRURY, F. K. W. *Some of the best dramas.* New York: H. W. Wilson Company, 1917.
This list consists of plays which have been acceptable as acting drama in their own age. There are also many other bits of advice included. It will not only be useful in the selection of a play but may be useful in classes in English.

HILL, FREDERICK T. *High school farces.* New York: Frederick A. Stokes, 1920.

JOHNSON, GERTRUDE E. *Choosing a play.* New York: Century Company, 1920.

This is probably the best book published on the subject.

Part I of the book takes up the problems of the theater as an educational institution, dramatic production and the educational curriculum, why the one-act play, dramatics in the high school, the place of pageantry in community life, notes on acting, material for production.

Part II gives the addresses of play publishers and brokers, lists of plays (graded), Christmas plays, plays for women actors, one-act plays in pamphlet form, one-act plays for male characters, books of one-act plays, plays possible for out-door production, plays for study and scene work, books of plays for children, other bibliographical lists, magazines and periodicals of assistance, books and articles on pageantry, books and articles on dramatization in school work, and books about the theater and acting.

KAPLAN, SAMUEL. *Actable one-act plays.* Chicago: Chicago Public Library, 1916.

MERRY, GLENN N. *High school plays. A compilation of data concerning plays recently presented in Iowa schools.* (State University of Iowa, Extension Division Bulletin No. 18.) Iowa City, Ia.: State University of Iowa, 1916.

This bulletin opens with an introduction telling how the list of plays was obtained, cost of plays, etc.; but most important is the list of plays which follows the introduction. For each play is given the title, author, publisher, classification as to whether it is a comedy, farce, or tragedy, number of stage settings, number of male and female characters, and the grade of satisfaction which the play gave the community. This list of plays is followed by the list of publishers with addresses and also a list of costume houses.

OGLEBAY, KATE. *Plays for children. A selected list.* New York: H. W. Wilson Company, 1920.

This is a list of plays suitable for children from six to sixteen years of age. This list also contains lists of reference books, books about costumes and scenery, books of stories and programs for story-telling, story-playing, readings and recitations, dramatic readers, plays, books of plays, plays for Christmas, and plays for other holidays.

MARGARET DOHERTY

*Bureau of Educational Research,
University of Illinois*

THE SELECTION OF TEXTBOOKS

I. GENERAL REFERENCES

Baker, George M. "Texts on textbooks," *American School Board Journal*, 59:48-50, August, 1919.

Cast, G. C. "Selecting textbooks," *Elementary School Journal*, 19:468-72, February, 1919.

Dewey, Henry B. "Adoption and purchase of textbooks," *American School Board Journal*, 60:39-40, 119, March, 1920.

Doughton, Isaac. "Choosing textbooks," *American School Board Journal*, 55:29-30, November, 1917.

Mr. Doughton, superintendent of schools at Phoenixville, Pennsylvania, discusses the plan which is followed in their system.

Hall-Quest, Alfred L. *The textbook. How to use and judge it.* New York: Macmillan Company, 1918. 265 pp.

Chapter iv discusses the selection and judgment of textbooks. A score card is reproduced.

Herzberg, M. J. "Ten rules in choice of textbooks," *American School Board Journal*, 54:26, 42, March, 1917.

Judd, Charles H. "Analyzing textbooks," *Elementary School Journal*, 19:143-54, October, 1918.

Maxwell, C. R. "Selecting textbooks," *School and Society*, 9:44-52, January 11, 1919.

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.

This is a discussion of the Cincinnati plan of selecting textbooks. It also gives the points to be considered in judging texts in arithmetic, reading, spelling, physiology, geography, and language.

"School books and eyesight," *School and Society*, 3:608, April 22, 1916.

A report of the committee of the British Association for the Advancement of Science on the type of the gloss of paper most suitable for textbooks.

"School books that ruin eyesight," *Literary Digest*, 46:394, February 22, 1913.

This earlier report of the committee of the British Association for the Advancement of Science concerns the size of type suitable for children of various ages. Specimens of each size of type are reproduced in the *Literary Digest*.

Taber, C. W. "The publisher's point of view concerning the method of selecting textbooks," *American School Board Journal*, 61:29-31, 99-100, September, 1920.

II. BY SUBJECTS

A. Arithmetic

Hall-Quest, Alfred L. *The textbook. How to use and judge it.* New York: Macmillan Co., 1918. pp. 92 ff.

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.

See especially p. 64.

B. Civics

Smith, C. Mabel. *A study of the content of civics textbooks.* University of Illinois, Urbana, Illinois, 1918. (Master's thesis.)

C. Domestic Science

Hanna, A. K. "Standard for high school textbooks in home economics," *Journal of Home Economics*, 8:349-52, July, 1916.

Trilling, Mabel B. *Home economics in American schools.* (Supplementary Educational Monographs, v. 2, no. 6, October, 1920), pp. 28-52.

D. Economics

Robinson, L. N. "Textbooks in economics," *School and Society*, 4:990-93, December 30, 1916.

E. Geography

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.

See pages 68-69.

Wang, Tang Chuen. *An analytical study of elementary geography textbooks in America.* University of Chicago, Chicago, 1918. (Master's thesis.)

F. History

Bagley, W. C. and Rugg, H. O. *The content of American history as taught in the seventh and eighth grades. An analysis of typical school textbooks.* (University of Illinois School of Education Bulletin No. 16.)

G. Manual Training

Laughlin, A. P. "Textbooks: Why use them? What kind?" *Manual Training*, 18: 187-88, January, 1917.

H. Mathematics

Arnold, Homer L. *An analysis of textbooks in plane geometry*. University of Chicago, Chicago, Illinois, 1917. (Master's thesis.)

I. Reading

Horn, Ernest. "Selection of Silent Reading Textbooks," *Journal of Educational Research*, 2:615-19, October, 1920.

Whitney, Frederick L. "Measuring the value of first-grade readers," *American School Board Journal*, 53:24, September, 1916.

Woody, Clifford. "The overlapping in the content of fifteen second readers," *Journal of Educational Research*, 2:465-474, June, 1920.

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.
See especially p. 67.

J. Science

Downing, E. R. "Zoology textbooks for secondary schools," *School Review*, 24:375-85, May, 1916.

Frank, O. D. "Data on textbooks on the biological sciences used in the middle west," *School Science and Mathematics*, 16:218-19, 354-57, March-April, 1916.

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.
On page 68 the points to be considered in judging texts in physiology are stated.

K. Spelling

"Current tendencies in the construction of spelling-books for elementary schools," *Elementary School Journal*, 18:464-69, February, 1918.

Woody, Clifford. "Application of scientific method in evaluating the subject matter of spellers," *Journal of Educational Research*, 1:119-28, February, 1920.

Mead, Cyrus D. "The best method of selecting textbooks," *Educational Administration and Supervision*, 4:61-69, February, 1918.
For spelling see page 68.

III. SCORE CARDS

Hall-Quest, Alfred L. *The textbook. How to use and judge it*. New York: Macmillan, 1918.

On page 96 a score card is reproduced. This score card was originally devised by Mr. L. L. Forsythe to be used in connection with arithmetic texts; it is also adaptable for texts in the other subjects.

Stoops, R. O. "The use of score cards for judging textbooks," *Illinois State Teachers' Association. Journal of Proceedings*, 1917, p. 114-19; also in *American School Board Journal*, 56:21-22, March, 1918.

Mr. Stoops has devised a score card for reading, language, and spelling textbooks.

Ginn and Company (15 Ashburton Place, Boston, Massachusetts) has published an "Arithmetic Score Card."

The Chicago Board of Education has worked out a score card for geography, language and other subjects.

MARGARET DOHERTY

Bureau of Educational Research,
University of Illinois

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Walter S. Monroe, University of Illinois, Urbana, Illinois.

Assistant Superintendent Joseph P. O'Hern of Rochester has been directing the work of a committee of principals and teachers in an effort to agree upon the different aims to be met in the teaching of reading. The result of the efforts of this committee has been the formulation of a chart entitled "Attainments in Reading." This chart gives for the kindergarten and each of the first six grades, specific objectives together with suggestions for attaining them. A copy of the chart has been furnished each teacher throughout the city of Rochester; and the chart is displayed on the walls of each classroom. Superintendent O'Hern has a few extra copies which he is distributing as long as they last. He is soliciting criticisms from teachers and school officials with a view to revising the chart next year.

Monroe's Standardized Silent Reading Test, Form 1, was given to 17,400 Denver school children on October 29, 1919. Form 2 of the same tests was given on May 27, 1920. A report prepared by Mrs. Emma M. Brown, Director of Reading Tests Measurements and Standards, covering the two applications of these tests, has been received. In it the following comments are made:

"The improvement is most satisfactory and great credit is due to both principals and teachers for the very effective work which has been done. The city medians for speed in all grades have been brought above the standard although much more can be accomplished in the lower grades by the application of newer methods. The medians for comprehension are above the standards for all grades with the exception of the fourth and fifth and even here much improvement has been made since September.

"There is still wide divergence between the performance of the different schools. In grade III the school with the best record has made a median score of 12.7 while the grade with the poorest score has made a median of 3. This difference is true for all grades. In many schools there has been a marked improvement in the regularity of progression from grade to grade; but in some, however, we still find the sixth grade doing better work than the seventh, or the third grade doing better work than the fourth."

In the September 1920 issue of the JOURNAL OF EDUCATIONAL RESEARCH, Dr. Walter S. Monroe presents a report of educational research in cities of over 10,000. In a table Dr. Monroe gives the number of cities in each state (except Delaware, Nevada, North Dakota and Tennessee) making systematic use of standardized tests or other scientific methods in their school systems and also the number making irregular use of such tests and methods. The 22 cities in which members of the National Asso-

¹ This statement was prepared for distribution at the School Administrators' Conference held on October 30, 1920.

WHERE DOES OHIO STAND?

RANK A			RANK B		
Rank	State	Per- cent	Rank	State	Per- cent
1	Wyoming.....	80	1	Wyoming.....	80
2	Nebraska.....	60	2	Nebraska.....	60
3	Minnesota.....	46	3	California.....	57
4	Kansas.....	45	4	Arkansas.....	56
5	Colorado.....	44	5	Colorado.....	56
6	Washington.....	42	6	Oklahoma.....	56
7	Arkansas.....	33	7	Minnesota.....	54
8	New Mexico.....	33	8	Oregon.....	50
9	Oklahoma.....	33	9	Wisconsin.....	48
10	Wisconsin.....	33	10	Kansas.....	45
11	Michigan.....	31	11	Louisiana.....	43
12	California.....	30	12	Montana.....	43
13	Kentucky.....	30	13	New Jersey.....	43
14	Missouri.....	30	14	Washington.....	42
15	New Jersey.....	30	15	Kentucky.....	40
16	Virginia.....	30	16	Michigan.....	40
17	Idaho.....	29	17	Mississippi.....	40
18	Illinois.....	29	18	New Hampshire.....	38
19	Louisiana.....	29	19	Illinois.....	34
20	Mississippi.....	29	20	Pennsylvania.....	34
21	Montana.....	29	21	New Mexico.....	33
22	Pennsylvania.....	29	22	Ohio.....	33
23	Ohio.....	25	23	West Virginia.....	33
24	Oregon.....	25	24	Virginia.....	30
25	Vermont.....	25	25	Idaho.....	29
26	Iowa.....	20	26	Mississippi.....	29
27	Connecticut.....	17	27	Connecticut.....	27
28	Indiana.....	17	28	Massachusetts.....	27
29	New York.....	15	29	Indiana.....	26
30	Florida.....	14	30	Vermont.....	25
31	New Hampshire.....	13	31	New York.....	23
32	Massachusetts.....	11	32	Iowa.....	20
33	West Virginia.....	11	33	South Dakota.....	20
34	Maine.....	10	34	Texas.....	19
35	North Carolina.....	08	35	South Carolina.....	17
36	Texas.....	04	36	Florida.....	14
37	Alabama.....	00	37	Alabama.....	13
38	Arizona.....	00	38	Rhode Island.....	11
39	Dist. of Columbia.....	00	39	Maine.....	10
40	Georgia.....	00	40	North Carolina.....	08
41	Maryland.....	00	41	Georgia.....	05
42	Rhode Island.....	00	42	Arizona.....	00
43	South Carolina.....	00	43	Dist. of Columbia.....	00
44	South Dakota.....	00	44	Maryland.....	00
45	Utah.....	00	45	Utah.....	00

Director, Extension Department,
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R. L. MORTON

ciation of Directors of Educational Research are in charge of this type of work were not included.

We have drawn upon Dr. Monroe's table for the data involved in the rankings on the accompanying sheet. In making our calculations we have assumed that the 22 cities referred to make systematic use of such tests and have included them. We have also assumed that all cities making use of tests replied to Dr. Monroe's letter—a doubtful assumption. A total of 253 cities are involved.

Rank A gives the percent of cities in each state making systematic use of tests. Rank B gives the percent making any use of the tests, systematic or irregular. Thus 25 percent of the cities of over 10,000 in Ohio (12) make systematic use of tests and 33 percent (16) make some use of them, four of the 16 using them irregularly.

Ohio occupies a median position in each column.

The rankings reveal very clearly the progressive tendency of the west and the conservatism of the east and south.

School administrators quite generally recognize that the marks assigned to pupils should, under average conditions, distribute themselves in close conformity to the normal surface of frequency. Practices differ as regards the number of intervals into which marks are distributed and also as regards the percent which it is thought desirable to have in each interval. A distribution of marks into five intervals, A, B, C, D, and E, is frequently found. This plan has the advantage of using as its unit-basis a commonly employed measure of variability, the *standard deviation*. Under normal, average conditions with a large number of pupils approximately 7 percent should be very superior or A's, 24 percent superior or B's, 38 percent average or C's, 24 percent inferior or D's, and 7 percent very inferior or E's.

The writer has found it necessary in making comparative studies of distributions of school marks to employ a formula that will make possible a close comparison of the normality of two or more distributions.

Let us illustrate with the marks contained in the accompanying table:

Interval	Number	Percent	Normal	Deviation	Error
A	23	15.9	7	+8.9	9.6
B	50	34.5	24	+10.5	13.8
C	44	30.3	38	-7.7	20.3
D	18	12.4	24	-11.6	48.3
E	10	6.9	7	-0.1	1.4
Total	145	100.0	100	.....	93.4

Of the 145 marks assigned, 23 (15.9 percent) are A's, 50 (34.5 percent) are B's, etc. Comparing these percents with the normal in the adjacent column we find that there is an excess of 8.9 percent in the A interval and of 10.5 percent in the B interval. But in the C, D, and E intervals there is a deficit so we have placed minus signs before the deviations for these intervals.

Now the magnitude of the error in any interval is judged by comparing the actual deviation with the greatest possible deviation *in the direction in which the deviation is made*. In the A interval, for example, obviously the greatest possible positive deviation occurs when all the marks are A's. In such an extreme case the deviation would be +93. Then the A error is determined by comparing 8.9 with 93. But 8.9 is 9.6 percent of 93. In like manner we find the B deviation, 10.5, to be 13.8 percent of 76, the greatest possible deviation in the direction in which the deviation occurs. The C deviation, however, is a negative deviation. The quantity 7.7 is 20.3 percent of 38, the greatest possible deviation in the direction in which the deviation occurs. In this case the greatest possible deviation is realized when no one in the class or school is assigned this mark. The errors in the D and E intervals are computed in exactly the same way as was that in the C interval. The quantity 11.6 is 48.3 percent of 24 and the quantity 0.1 is 1.4 percent of 7.

The error of the distribution then may be expressed by the following formula:

$$E = \frac{\sum e}{n} = \frac{93.4}{5} = 18.7.$$

The coefficient of accuracy,

$$A - 100 - E = 100 - 18.7 = 81.3.$$

Of course this method may be applied to a system of rating which distinguishes any number of marks—e.g., a three-point or a seven-point system. The normal distribution of marks for such a system must first be determined from a table showing the fractional parts of the area under the normal probability curve. For a three-point system this distribution in terms of percent of marks would be 16, 68, 16; for a seven-point system, 2, 8, 23.5, 33, 23.5, 8, 2.

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R. L. MORTON

The Barr Diagnostic Tests in American History, Series 2A and 2B, have recently been published by the Bureau of Educational Research.¹ These tests represent a new attack upon the problems of measuring ability in the field of history.

There are five tests: (1) comprehension, (2) chronological judgment, (3) historical evidence, (4) evaluation of facts, and (5) causal relationships. When the history pupil is confronted with the printed page he must first read and understand the material placed before him. History is a reading subject, but differs from general reading in that it employs historical background and a technical language. Then, secondly, the really "historically minded" person asks: "Are the facts here stated true?" Pupils frequently pass over this step with a vague general feeling that all printed facts are true. The third inquiry is: "Is the fact important?" Even the most immature pupil will make some selection. Few choose to memorize the text verbatim. The fourth step is to place the facts in time order. The facts of history are peculiar in that they are all placed in a definite time relationship. When taken out of this time relationship they lose their historical significance. And finally the facts of history must be studied in their relation to other facts. The facts of history are not isolated facts, but rather trains of facts tied in causal relations. Five tests are given—each to measure one of these five fundamental processes.

¹ A copy of these can be obtained from the Public School Publishing Company, Bloomington, Illinois, who are distributing them under the auspices of the Bureau of Educational Research, University of Illinois, Urbana, Illinois.

While the information factors have not been entirely eliminated, the tests deal, in the main, with general historical information rather than with specific facts. Although the tests deal with abilities rather than specific facts they are not designed to measure native historical ability or general intelligence but include school training, home training, and previous experience—the sum total of abilities—in so far as these abilities bear upon the ability to do these particular exercises. While the tests may be used to measure achievement in history, they aim primarily to aid the teacher in giving more intelligent classroom instruction by diagnosing the particular need of the individual pupil.

The tests have been three times revised, but not standardized. It is hoped that more definite weightings of the different questions can be supplied in the near future.

While measurement of content is not directly aimed at in these tests, the content is, however, based upon the available studies on the content in American history including Bagley and Rugg. In the main only the larger and more important facts in American history have been included.

With the great increase in the number and extent of educational and intelligence tests, school administrators and teachers are confronted with a real problem. This is

Illinois Standardized Algebra Test

to find the time to give the tests. A school day, already too short, must either be lengthened or some part of the regular work must be set aside. A second, though perhaps minor difficulty, is the expense involved in the purchase of tests.

Many school authorities, at present facing a financial crisis, are compelled to practice the severest of economy. It therefore seems that the devisers of tests should give consideration to these factors.

At present, algebra seems to be a field which affords an opportunity for a test relatively inexpensive and requiring but a short time to administer. The Bureau of Educational Research of the University of Illinois has recently made available such a test.¹ It was devised by Professor W. S. Monroe and Mr. Lewis W. Williams. It is based upon the simple equation since the simple equation, the processes it involves and the processes involving it, constitute a very large part of the work of the first year in algebra.

The test consists of four parts, each of which contains twenty exercises. In part one, the two unknown quantities are in the first member of the equation; in parts two, three, and four, there is one unknown in each member. Part three differs from part two in that it involves the parenthesis. In part four, the fractional form is found in both members of the equation. The test can easily be given within a single class period. Four minutes are allowed for part one, five for part two, nine for part three, and ten for part four. This permits twelve minutes out of a forty-minute period to be devoted to directions, passing and collecting papers, and the usual interruptions.

The cycle arrangement is used in each part, each of which consists of five cycles of four members each. These members differ from each other in the arrangement of

¹ Copies of this test may be secured from the Public School Publishing Company, Bloomington, Illinois, which is distributing them under the auspices of the Bureau of Educational Research of the University of Illinois.

the signs. The following arrangement is carried out: $+-+-$, $-++-$, $++--$, and $+-+-$. The general plan may be illustrated as follows:—

$$\text{Part I: } \pm ax \pm bx = \pm c \pm d$$

$$\text{Part II: } \pm ax \pm c = \pm bx \pm d$$

$$\text{Part III: } \pm k(\pm ax \pm c) = \pm bx \pm d$$

$$\text{Part IV: } \pm \frac{ax \pm c}{n_1} = \pm \frac{bx \pm d}{n_2}$$

From inspection it is evident that there are many combinations of signs which might be used, particularly in parts three and four. The above plan was arbitrarily chosen. Variations are produced by changing the relative size of the numerical coefficients of the unknowns as regards the knowns. The cycle arrangement, accurately carried out, may produce results showing diagnostic properties inherent in the test. Evidence of this appeared quite clearly in preliminary trials. For example, if some member of a cycle really represents a distinct type of problem, a pupil missing it in the first cycle would be apt to miss the corresponding member in at least a majority of the other cycles. If after the test has been submitted to a large number of pupils, results show this tendency holds throughout the test, much assistance will be given to the teacher. In any event, the test has general properties which seem to justify its appearance.

The Illinois Standardized Algebra Test, as it is called, has recently been placed in the hands of teachers to be given to six hundred pupils. As soon as results are available, tendency standards will be issued. Standards will be set up for pupils who have had one semester of work in algebra, as well as for those who have had two and three, respectively.

University of Illinois

LEWIS W. WILLIAMS

The following quotation is taken from the Detroit Educational Bulletin for November 1920. It is reprinted here partly because of the general interest in intelligence tests and partly because it illustrates a well thought-out

Use of a First-Grade Intelligence Test method of making use of the results of these tests.

Intelligence Test in Detroit "Under the direction of the Psychological Clinic, more than ten thousand B I pupils were given a group intelligence examination during September 1920. The examination was given by sixty special class teachers, assisted by members of the Psychological Clinic. The test used is known as the Detroit First Grade Intelligence Test, which was devised by the Psychological Clinic during the past school year. The ten thousand pupils examined were classified approximately as follows: the 8% receiving the highest score were given an intelligence rating of A; the next 12%, B; the next 18%, C+; the next 24%, C; the next 18%, C-; the next 12%, D; and the last 8%, E. In other words, 20% of the children tested were given A or B ratings, 60%, C+, C, or C- ratings, and 20%, D or E ratings. In this examination, less than one-half of one per cent of the pupils tested made a zero score and no pupil made a perfect score. It is interesting to note the extent to which different schools vary in respect to the ability of B I pupils. In several schools there were no pupils who received a grade of E or D, while in certain other schools there were no pupils receiving B or A grades.

"A letter from the Superintendent of Schools was sent to the principal of each school along with the intelligence ratings of the B I pupils. The letter from the Super-

intendent recommends that the intelligence ratings be used in one or more of the following ways:

"1. Arrange the pupils in three groups, the groups to be known as Groups X, Y and Z; Group X to consist only of pupils with an intelligence rating of A or B; Group Y to consist only of pupils with an intelligence rating of C+, C or C-; and Group Z to consist only of pupils with an intelligence rating of D or E. By this method, X, Y and Z will always designate pupils of about the same grade of ability regardless of the school in which they might be found. If for any reason, you do not find it advisable to follow the grouping suggested, you should designate the groups that you may form by symbols other than X, Y or Z. The X, Y and Z groups in the B First are to be designated as I B-X, I B-Y and I B-Z. The assignment by letter ratings of pupils to Groups X, Y and Z is to be considered tentative. You have the authority to transfer a pupil from one group to another as soon as you are convinced that the pupil is not properly classified, provided you keep a record of the number of and the reasons for such transfers, in order that the Clinic may have definite information as to the accuracy of its classification. The Psychological Clinic stands ready to assist you in the more accurate classification of the apparent misfits by individual examination.

"The pupils who are found to be able to do more work than is required of the group to which they belong are to be transferred to the next higher group, those who cannot do the work of the group to which they belong will be transferred to the next lower group, and those who cannot keep up with the lowest group, or Group Z, will be considered candidates for the special classes and will be given an individual examination by the Psychological Clinic. It is suggested in this connection that the unassigned or coaching teachers could be of marked assistance in helping classify the apparent misfits.

"The principals who adopt this method of classification are encouraged, under the direction of the Department of Educational Research, to work out courses of study for the X and Z groups, an enriched course of study for the X Group, and a course in minimum essentials for the Z Group. In schools where there are not enough A and B or D and E pupils for a single room, it is suggested that two groups be placed in the same room, or that like groups from adjacent schools be put together.

"2. In schools where all the pupils, because of congested conditions, cannot attend full time, the intelligence ratings can be used to select the pupils that stand most in need of full time instruction. It is believed that the pupils with an intelligence rating of A, B and C+ might be so grouped and the course of study so organized that they would actually accomplish more during a half-day session than they are now able to accomplish during a full day session in the schools where the congestion is the greatest.

"3. In small schools where there are only a few cases of pupils securing an A or B rating, these pupils might be given special help by the unassigned teacher in order that they may pass quickly into the A first grade. This method was used to advantage in one or two of the schools last year where the first grade children were classified by means of intelligence tests. In the schools where there are only a few pupils who receive a D or E rating, the unassigned teacher could to advantage give these pupils special attention in order that the special class cases might receive an individual psychological examination as soon as possible."

National Association of Directors of Educational Research

(E. J. ASHBAUGH, *Secretary and Editor*)

DO YOU KNOW

That Standardized Tests are most valuable for DIAGNOSTIC PURPOSES?

A good physician always diagnoses each important case before giving advice and repeats certain parts of his diagnosis from time to time to determine the progress of the case.

In like manner, a good teacher at the beginning of the year diagnoses each pupil sent her and repeats certain parts of her diagnosis from time to time to determine progress.

The physician has far more accurate instruments and tests for diagnosis than he had a few decades ago. Hence, his data are now more accurate, his advice more valuable, and his success greater. So in the realm of teaching, improved instruments for diagnosis have been devised. The last decade has seen the development of the standardized tests of pupil achievement. These tests are superior for diagnostic purposes to the tests, measures, and examinations devised by the teacher, principal or other school officials. Their superiority depends chiefly upon two factors:

1. The standardized tests are more objective. Hence, the results are fairer and more impersonal.

2. They are standardized by grades. Hence, by the application of these tests and the comparison of the results with the grade norms or standards, the teacher may know whether each pupil whom she receives is, in general, up to standard for his grade when she receives him; she may also know in which subjects each pupil is below, and in which subjects above, standard. Good teaching begins with what the child KNOWS and IS. Hence, the need for accurate diagnosis.

During the year 1918-1919 many teachers in the Kansas City schools used standardized tests for diagnostic purposes with most excellent results. This use of the tests has been so helpful that the Bureau of Research and Efficiency is planning to make itself this year purely a *Service Bureau*. This service aims to accomplish the following things:

1. To supply any teacher or principal with any tests he may need in his school work.

2. To assist both teachers and principals in selecting and giving tests and in tabulating and interpreting results.

3. To cooperate in improving the organization of the school, the classification of pupils, and the methods of teaching so as to secure better service for the pupils.

4. To confer with teachers and principals on any problems, especially problems of school instruction, grade objectives or standards, and school achievement.

THE BUREAU IS YOUR SERVANT AND EXISTS SOLELY TO ASSIST YOU IN GIVING THE CHILDREN THE BEST POSSIBLE SERVICE. CALL UPON THE BUREAU FOR ANY SERVICE IT CAN RENDER.

(The above is a part of a circular letter sent in September 1919 to all teachers and principals in the Kansas City schools. It is one of the various instruments used by Mr. Melcher and his assistants in getting the bureau of which he is head to function through the regular school organization and render service to the children of the city. That the program was worth while and reached at least some of its objectives may be inferred from the following from his most recent letter: "During the year 1920-21, it is planned to use the same method that was used during 1919-20." The secretary would welcome copies of circular letters, bulletins, reports, etc., which the members send to their principals and teachers, together with any comment which may explain the use or results from the same.—SECRETARY.)

Detroit.—Homer W. Anderson, Assistant Director of Educational Research, reports the following interesting activities of his department:

1. Have standardized and given a typewriting test in all high schools of the city. Tentative standards are now available.
 2. Developing a series of tests in chemistry.
 3. Committee of mathematics teachers are at work on evaluation of present algebra tests with a view to using the most satisfactory or to developing a new set.
 4. Committees of high-school teachers under the direction of the department of research are carrying on investigations in foreign languages, science, and social science.
 5. Department is cooperating in the formulation of building program for the city.
-

Oakland.—Virgil E. Dickson, our vice-president, says that his bureau is "continuing the policy of former years in making strong emphasis on studying the capacities of children. We believe that standard mental tests and standard pedagogical tests must go hand in hand in studying the educational problems that confront us."

They will soon complete the mental testing, either group or individual, of every child in the school system. Comparison of achievement or pedagogical tests and I. Q. with instructional time is expected to give a better check on quality of teaching than was before possible.

They find it thoroughly possible in practical administration to have classes for superior, normal, and retarded groups and have several committees at work on courses of study for different subjects which shall be adjusted to this "three-track" plan.

Beaumont, Texas.—Miss Clara Mallory reports that they too are working on reclassification through the use of mental tests. At the opening of the present school year, the Otis test was given to over two hundred high-school freshmen and classification was made on the basis of the test. Mental ages of eight to eighteen were found in the group.

The graduating class from the eighth grade will be given the Otis test this coming spring in order that classification may be ready when school opens in the fall.

Haggerty Achievement Examination in Reading, Sigma 1, was given for classification purposes to children in grades II and III.

Pedagogical tests will be given at the beginning of the second and fourth quarters and results recorded on individual rating cards as last year.

Kansas City, Missouri.—George Melcher, director of the bureau, has been the president of the Missouri State Teachers' Association during the past year. The association has an enrollment of fifteen thousand; and the recent meeting had an attendance of six thousand. This has taken much of the president's time since an extensive publicity campaign for increasing teachers' salaries and revenue for schools has been carried on.

Here also group intelligence tests have been used for reclassification of pupils. About five thousand children have been tested and in one high school the freshmen have been divided into three groups, superior, average and inferior. The teachers know the rating of the classes they teach but in most cases the children do not. The same principle is being followed in one large elementary school.

For the first time, this fall the bureau is testing kindergarten and first-grade children by means of the Stanford Revision of Binet and adjusting classes in accordance with the findings. The teachers are well pleased with the results.

A general survey will be made this year of the whole system in two or three subjects, probably geography, language, and reading.

Cleveland.—W. W. Theisen, the new director, says that he "hesitates to say much about what we are doing as we are just getting started." However, he does tell a few things.

1. Testing entering first grade pupils in forty schools with Pressey Primer Scale.
2. Planning to test all graduating high-school seniors and incoming junior high-school pupils with group intelligence tests.
3. November 2 the electors of Cleveland indorsed a fifteen million dollar bond issue and a special five-year three-mill tax levy for general purposes. This was not particularly the work of the bureau but indicates the faith the public has in its schools.
4. Personally, Dr. Theisen is finishing his study for the *Yearbook* on "Factors Affecting Results in Primary Reading."

Iowa City, Iowa.—H. A. Greene and E. J. Ashbaugh of the University of Iowa Bureau of Educational Service have been unusually busy this fall with calls for definite service in the field. Dr. Greene conducted an intensive survey of the English and mathematics situation in the eighth grade and high school in Marshalltown and is now engaged in assisting the city of Keokuk in putting over a high-school building program.

Dr. Ashbaugh has continued his work for the Atlantic school board, has conducted an instructional survey at Forest City, and has received several calls for service with county superintendents. These calls have been in connection with the use of standardized tests in rural survey and supervision.

Dr. Ashbaugh is state chairman of the N. E. A. committee appointed to study relative efficiency of one room rural schools and consolidated schools. Other of our members doubtless hold the same position for their state.

We are glad to welcome two more new members to our association. They are:
Dr. Bird T. Baldwin, Director of the Child Welfare Research Station, Iowa State University, Iowa City, Ia.

Mr. H. D. Rinsland, Director of Bureau of Research and Guidance, Ardmore, Oklahoma.

JOURNAL *of* EDUCATIONAL RESEARCH

VOLUME III

FEBRUARY, 1921

NUMBER 2

STANDARDIZED VOCABULARY AND SENTENCE TESTS IN FRENCH

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The ultimate objectives of modern foreign language study are the ability to understand the language, written or spoken, and the ability to speak or write the language. The most obvious indices of ability to understand a foreign language would be found in the number of words whose meanings are known or whose equivalents in English can be given, and in the rate of accuracy of translating connected discourse from the mother tongue to the foreign language. Ability or progress in a foreign language may then be measured by determining (1) the scope and accuracy of vocabulary, and (2) the difficulty of sentences that are understood or can be translated into English. The present paper will report tests for measuring ability in French in these two directions. The method and technic are the same as used in developing the Henmon Vocabulary and Sentence Tests in Latin.¹ The method of scaling words or sentences in difficulty is given in full in these papers and has been reported in many other studies in recent years so often that the statistical discussion in this report will be much abbreviated. I am greatly indebted to my wife and to Miss Alice Jackson for the laborious task of tabulating and scoring the papers and to many principals and teachers of French for giving the preliminary tests.

VOCABULARY TESTS

The essential difficulty in the construction of vocabulary tests lies in the selection of words to be used. If results are to be strictly comparable beyond the limits of a single class or of classes using the same text, they must necessarily be such as the pupil

¹ Henmon, V. A. C. "The measurement of ability in Latin," *Journal of Educational Psychology*, 8:515-38, 589-99; 11:121-36, November-December, 1917; March, 1920.

has certainly come in contact with and might reasonably be expected to know. In order to overcome this difficulty and to secure a standard vocabulary a tabulation was made of all the words occurring in twelve recent or widely used first-year texts, selected by competent teachers of French. The result was a list of 448 words out of approximately 4,000 words common to all the books. While these 448 words will occur with varying frequency in the different texts, the chances are slight that, if any other book is used than one of the twelve from which the tabulations were made, these words would not be found. The list, therefore, forms in a real sense a standard vocabulary.

The 448 words were divided into four lists of 112 words each. These lists appear in Table II. They were given to first-, second-, and third-year pupils in sixteen schools distributed in six states. They were given also to pupils who had had one-half, one and a half, and two and a half years of French, but the number of schools is too small for use in determining scale values. Similarly the number of schools and of pupils in the third year is too small for satisfactory use. Table I gives the results, therefore, for first- and second-year pupils only, both the averages and medians being given for the convenience of those who may wish to give the original lists rather than the tests derived from them. The difference between the two measures of central tendency is sometimes fairly large where the number of cases is small or the skewness of the distribution is marked. In scoring the words in the preliminary tests any translation given in a standard dictionary was accepted. Where words such as "lit," "la," "vers," and "montre" had several meanings, any one was scored as correct.

The averages and medians in Table I were obtained by scoring the number of words correct regardless of the variation in the difficulty of the words. It is, of course, inaccurate to assign the same value to *animal*, which is never missed by either first or second-year pupils, as to *afin que*, which is missed by 78 percent of first-year, and 76.8 percent of second-year pupils. The purpose of the study was to determine the weight or values to be assigned to each word for each year and a general scale value or weight. The information necessary for this purpose appears in Table II which gives the percent of times each word was correctly translated in the first and second years. These percents cannot be used directly since it is necessary to make allowance for the fact

TABLE I. RESULTS IN THE VOCABULARY TESTS, ALL SCHOOLS COMBINED

LISTS	FIRST-YEAR PUPILS			SECOND-YEAR PUPILS		
	No. of Pupils	Averages	Medians	No. of Pupils	Averages	Medians
I	415	82.0	85	95	100.0	102
II	517	76.5	79	70	95.3	98
III	440	76.8	78	109	94.9	99
IV	482	74.2	77	125	93.8	96
All.....	1,854	77.3		399	95.0	

that the distribution of mental abilities is normal, or in accordance with the bellshaped curve of distribution, and not rectangular. The method by which this is done consists in substance of locating each word on the base line of a normal surface of frequency in terms of the probable error equivalents of the percent of times it is correctly translated. In order to eliminate minus values an approximation to a zero point of ability was arbitrarily taken by locating the position of a word so easy as to be missed by but five out of one thousand first-year pupils. This point lies 3.8 times the probable error below the median. A word so difficult as to be translated correctly by but five out of one thousand pupils would be located at +3.8 P. E. The scale values which appear in Table II were determined by subtracting from or adding to 3.8 P. E., the P. E. equivalents of the percent of times each word was correctly translated.

The derivation of the general scale value required the determination of the size of the intervals between the medians of the first and second years, and this requires the amount and percent of overlapping between the two years.

The details of these calculations are omitted. It will suffice to state that the interval between the first and second years expressed in terms of the probable error as the unit of measurement is 2.315 P. E. The average position of the zero point is therefore -2.642 P. E. which becomes the point of reference to which each word is referred. The general scale values thus derived represent the best approximation to an average weight to be assigned regardless of year or grade.

TABLE II. TOTAL LIST OF 448 WORDS GIVEN PUPILS

List 1	• Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
1. à.....	96.1	98.9	1.2	0.4	0.8
2. âge.....	88.7	100.0	2.0	0.0	1.0
3. alors.....	81.9	96.8	2.4	1.1	1.7
4. ancien.....	94.0	97.9	1.5	0.8	1.1
5. appartenir.....	11.3	18.9	5.6	5.1	5.3
6. après.....	72.5	86.3	2.9	2.2	2.5
7. arriver.....	98.3	98.9	0.7	0.4	0.5
8. aussi.....	99.0	96.8	0.3	1.1	0.7
9. autre.....	90.6	96.8	1.8	1.1	1.4
10. avoir.....	90.1	98.9	1.9	0.4	1.1
11. bien.....	97.4	100.0	0.9	0.0	0.4
12. bleu.....	95.7	98.9	1.3	0.4	0.8
13. bout.....	32.8	60.0	4.5	3.4	3.9
14. café.....	96.6	97.9	1.1	0.8	0.9
15. ceci.....	62.7	75.8	3.3	2.8	3.0
16. cependant.....	34.7	83.1	4.4	2.4	3.4
17. champ.....	70.4	91.5	3.0	1.8	2.4
18. chaud.....	59.8	85.2	3.4	2.3	2.8
19. cheval.....	91.3	98.9	1.8	0.4	1.1
20. chose.....	77.1	97.9	2.7	0.8	1.7
21. classe.....	97.6	100.0	0.9	0.0	0.4
22. commencer.....	98.1	98.9	0.7	0.4	0.5
23. connaître.....	54.7	96.8	3.6	1.1	2.3
24. côté.....	51.6	90.5	3.7	1.9	2.8
25. courir.....	54.2	91.5	3.6	1.8	2.7
26. craindre.....	22.4	57.9	4.9	3.5	4.2
27. dans.....	97.4	100.0	0.9	0.0	0.4
28. déjà.....	68.7	87.3	3.1	2.1	2.6
29. demi.....	74.9	97.9	2.8	0.8	1.8
30. descendre.....	95.2	100.0	1.3	0.0	0.6
31. devant.....	64.8	90.5	3.2	1.9	2.5
32. dîner.....	91.1	91.5	1.7	1.8	1.7
33. droit (adj.).....	59.3	92.6	3.5	1.7	2.6
34. élève.....	84.3	84.2	2.3	2.3	2.3
35. encore.....	93.5	95.8	1.6	1.3	1.4
36. entre.....	43.8	80.0	4.0	2.6	3.3
37. et.....	99.0	100.0	0.3	0.0	0.1
38. faire.....	92.9	100.0	1.6	0.0	0.8

TABLE II—CONTINUED

List 1—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
39. fenêtre.....	97.2	97.9	1.0	0.8	0.9
40. fils.....	73.0	96.8	2.9	1.1	2.0
41. fois.....	67.4	97.9	3.1	0.8	1.9
42. franc (n.).....	86.9	95.8	2.1	1.3	1.7
43. fruit.....	93.3	97.9	1.6	0.8	1.2
44. gens.....	53.3	85.2	3.7	2.3	3.0
45. guerre.....	75.2	93.7	2.8	1.5	2.1
46. heureux.....	82.4	98.9	2.4	0.4	1.4
47. homme.....	99.0	100.0	0.3	0.0	0.1
48. inviter.....	96.1	100.0	1.2	0.0	0.6
49. jeter.....	51.6	89.4	3.7	1.9	2.8
50. journal.....	89.2	95.8	2.0	1.3	1.6
51. laisser.....	60.0	83.1	3.4	2.4	2.9
52. le.....	95.9	100.0	1.2	0.0	0.6
53. leur.....	89.2	97.9	2.0	0.8	1.4
54. lire.....	51.6	96.8	3.7	1.1	2.4
55. loin.....	18.9	61.1	5.1	3.4	4.2
56. madame.....	90.3	98.9	1.9	0.4	1.1
57. mais.....	99.2	100.0	0.2	0.0	0.1
58. manger.....	93.5	97.9	1.6	0.8	1.2
59. me.....	88.7	91.5	2.0	1.8	1.9
60. mer.....	65.3	83.1	3.2	2.4	2.8
61. mieux.....	55.9	84.2	3.6	2.3	2.9
62. moins.....	56.1	87.4	3.6	2.1	2.8
63. monde.....	88.2	97.9	2.0	0.8	1.4
64. montrer.....	68.7	66.3	3.1	3.2	3.1
65. mourir.....	58.8	90.5	3.5	1.9	2.7
66. ni.....	70.8	89.4	3.0	1.9	2.4
67. notre (pron.).....	82.9	94.7	2.4	1.4	1.9
68. nuit.....	81.7	97.9	2.5	0.8	1.6
69. offrir.....	88.2	100.0	2.0	0.0	1.0
70. oreille.....	33.1	68.4	4.4	3.1	3.7
71. ou.....	63.9	64.2	3.3	3.3	3.3
72. ouvrir.....	73.3	91.5	3.0	1.8	2.4
73. paraître.....	12.0	70.5	5.5	3.0	4.2
74. partie.....	48.7	74.7	3.8	2.8	3.3
75. passer.....	92.7	96.8	1.6	1.1	1.3

TABLE II—CONTINUED

List 1—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
76. pendant.....	48.9	83.1	3.8	2.4	3.1
77. permettre.....	69.1	94.7	3.1	1.4	2.2
78. peu.....	85.5	98.9	2.2	0.4	1.3
79. plein.....	35.9	80.0	4.3	2.6	3.4
80. plusieurs.....	53.3	73.7	3.7	2.9	3.3
81. porter.....	82.9	94.7	2.4	1.4	1.9
82. pouvoir.....	58.3	91.5	3.5	1.8	2.6
83. presque.....	35.2	76.8	4.4	2.7	3.5
84. promener.....	70.6	90.5	3.0	1.9	2.4
85. quatre.....	96.8	97.9	1.1	0.8	0.9
86. que (pron.).....	89.4	90.5	1.9	1.9	1.9
87. qui.....	92.8	97.9	1.6	0.8	1.2
88. quoique.....	14.9	25.3	5.3	4.8	5.0
89. rentrer.....	47.9	62.1	3.9	3.3	3.6
90. rendre.....	60.2	70.5	3.4	3.0	3.2
91. robe.....	93.0	97.9	1.6	0.8	1.2
92. sans.....	79.5	96.8	2.6	1.1	1.8
93. second.....	89.9	97.9	1.9	0.8	1.3
94. sept.....	93.5	98.9	1.6	0.4	1.0
95. si.....	92.3	98.9	1.7	0.4	1.0
96. soleil.....	88.9	95.8	2.0	1.3	1.6
97. sou.....	62.4	76.8	3.3	2.7	3.0
98. souvent.....	53.1	82.1	3.7	2.4	3.0
99. suivre.....	24.8	87.4	4.8	2.1	3.4
100. tant.....	26.3	68.4	4.7	3.1	3.9
101. temps.....	94.2	95.8	1.5	1.3	1.4
102. tomber.....	77.7	97.9	2.7	0.8	1.7
103. tout (adv.).....	91.3	85.2	1.8	2.3	2.0
104. très.....	96.1	98.9	1.2	0.4	0.8
105. trouver.....	88.5	100.0	2.0	0.0	1.0
106. vache.....	80.9	82.1	2.6	2.4	2.5
107. vent.....	62.4	78.9	3.3	2.6	2.9
108. viande.....	75.2	86.3	2.8	2.2	2.5
109. vingt.....	88.7	94.7	2.0	1.4	1.7
110. vivre.....	74.7	93.7	2.8	1.5	2.1
111. voiture.....	22.3	93.7	4.9	1.5	3.2
112. vous.....	97.2	95.8	1.0	1.3	1.1

TABLE II—CONTINUED

List 2	Percents Correct		Year Scales Values		General Scale Values
	I	II	I	II	
1. acheter.....	95.0	97.1	1.4	1.0	1.2
2. aimer.....	98.3	100.0	0.7	0.0	0.3
3. ami.....	98.3	100.0	0.7	0.0	0.3
4. animal.....	100.0	100.0	0.0	0.0	0.0
5. appeler.....	79.3	100.0	2.6	0.0	1.3
6. arbre.....	97.9	97.1	0.8	1.0	0.9
7. assez.....	59.6	80.0	3.4	2.6	3.0
8. aussitôt.....	28.0	37.1	4.7	4.3	4.5
9. avancer.....	83.6	92.9	2.4	1.6	2.0
10. beau.....	98.6	100.0	0.5	0.0	0.2
11. bientôt.....	49.9	52.9	3.8	3.7	3.7
12. boire.....	43.7	74.3	4.0	2.8	3.4
13. bras.....	55.5	91.4	3.6	1.8	2.7
14. campagne.....	88.6	91.4	2.0	1.8	1.9
15. cela.....	72.1	87.1	2.9	2.1	2.5
16. chacun.....	36.3	88.6	4.3	2.0	3.1
17. chanter.....	91.3	97.1	1.8	1.0	1.4
18. chemin.....	54.9	91.4	3.6	1.8	2.7
19. chez.....	53.6	47.1	3.7	3.9	3.8
20. ciel.....	58.0	92.9	3.5	1.6	2.5
21. cœur.....	72.5	100.0	2.9	0.0	1.4
22. comment.....	64.4	94.3	3.3	1.5	2.4
23. content.....	93.0	100.0	1.6	0.0	0.8
24. coucher.....	61.1	91.4	3.4	1.8	2.6
25. court.....	23.8	45.7	4.9	4.0	4.4
26. crier.....	81.8	95.7	2.5	1.3	1.9
27. de.....	94.8	98.6	1.4	0.5	0.9
28. déjeuner (n.).....	32.3	45.7	4.5	4.0	4.2
29. depuis.....	29.2	77.1	4.6	2.7	3.6
30. désirer.....	99.6	100.0	0.0	0.0	0.0
31. devenir.....	20.3	47.1	5.0	3.9	4.4
32. dont.....	36.9	55.7	4.3	3.6	3.8
33. eau.....	83.4	97.1	2.4	1.0	1.7
34. elle.....	98.6	100.0	0.5	0.0	0.2
35. enfant.....	96.3	100.0	1.2	0.0	0.6
36. entrer.....	96.5	98.6	1.1	0.5	0.8
37. être.....	91.7	98.6	1.7	0.5	1.1
38. falloir.....	21.3	52.9	5.0	3.7	4.3

TABLE II—CONTINUED

List 2—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
39. fer.....	42.9	67.1	4.1	3.1	3.6
40. fin (n.).....	47.0	85.7	3.9	2.2	3.0
41. fort.....	74.7	94.3	2.8	1.5	2.1
42. frapper.....	77.0	95.7	2.7	1.3	2.0
43. gagner.....	35.2	85.7	4.4	2.2	3.3
44. grammaire.....	97.7	97.1	0.8	1.0	0.9
45. habit.....	42.9	67.1	4.1	3.1	3.6
46. hier.....	74.3	91.4	2.8	1.8	2.3
47. huit.....	75.6	97.1	2.8	1.0	1.9
48. jamais.....	82.4	100.0	2.4	0.0	1.1
49. jeune.....	91.5	97.1	1.8	1.0	1.4
50. journée.....	22.1	65.7	4.9	3.2	4.0
51. lait.....	68.3	88.6	3.1	2.0	2.5
52. leçon.....	94.2	97.1	1.5	1.0	1.2
53. lever.....	59.8	97.1	3.4	1.0	2.2
54. lit.....	38.3	85.7	4.2	2.2	3.2
55. long.....	87.0	98.6	2.1	0.5	1.3
56. magasin.....	84.9	92.9	2.3	1.6	1.9
57. maison.....	99.4	97.1	0.1	1.0	0.5
58. marcher.....	88.4	100.0	2.0	0.0	1.0
59. meilleur.....	69.6	91.4	3.0	1.8	2.4
60. mère.....	98.8	100.0	0.4	0.0	0.2
61. mille.....	71.8	95.7	2.9	1.3	2.1
62. moindre.....	25.5	37.1	4.8	4.3	4.5
63. monsieur.....	98.1	100.0	0.7	0.0	0.3
64. morceau.....	77.2	91.4	2.7	1.8	2.2
65. ne.....	76.6	87.1	2.7	2.1	2.4
66. noir.....	76.0	85.7	2.8	2.2	2.5
67. notre (adj.).....	78.9	91.4	2.6	1.8	2.2
68. nul.....	26.3	31.4	4.7	4.5	4.6
69. on.....	67.1	82.9	3.1	2.4	2.7
70. ordonner.....	44.9	68.6	4.0	3.1	3.5
71. oublier.....	43.5	90.0	4.0	1.9	2.9
72. pain.....	91.5	98.6	1.8	0.5	1.1
73. parce que.....	77.8	98.6	2.7	0.5	1.6
74. partir.....	66.1	95.7	3.2	1.3	2.2
75. pauvre.....	93.2	100.0	1.6	0.0	0.8

TABLE II—CONTINUED

List 2—Continued	Percents Correct		Year Scales Values		General Scale Values
	I	II	I	II	
76. penser.....	80.7	100.0	2.5	0.0	1.2
77. personne (n.).....	57.5	52.9	3.5	3.7	3.6
78. peur.....	27.0	80.0	4.7	2.6	3.6
79. pleurer.....	32.7	70.0	4.5	3.0	3.7
80. point (adv.).....	10.6	34.3	5.7	4.4	5.0
81. pour.....	89.4	91.4	1.9	1.8	1.8
82. premier.....	95.6	98.6	1.3	0.5	0.9
83. prêt.....	41.0	62.9	4.1	3.3	3.7
84. puis.....	51.8	70.0	3.8	3.0	3.4
85. que (conj.).....	76.4	88.6	2.7	2.0	2.3
86. quinze.....	75.8	87.1	2.8	2.1	2.4
87. recevoir.....	89.8	98.6	1.9	0.5	1.2
88. remarquer.....	88.4	91.4	2.0	1.8	1.9
89. répondre.....	92.6	100.0	1.7	0.0	0.8
90. riche.....	98.3	100.0	0.7	0.0	0.3
91. rouge.....	97.7	98.6	0.8	0.5	0.6
92. sauver.....	38.3	62.9	4.2	3.3	3.7
93. semaine.....	68.7	92.9	3.1	1.6	2.3
94. servir.....	77.0	97.1	3.7	1.0	2.3
95. six.....	97.3	100.0	0.9	0.0	0.4
96. soir.....	68.5	92.9	3.1	1.6	2.3
97. soulier.....	26.7	62.9	4.7	3.3	4.0
98. sucre.....	71.0	88.6	3.0	2.0	2.5
99. sur.....	90.9	80.0	1.8	2.6	2.2
100. tante.....	61.7	82.9	3.4	2.4	2.9
101. tenir.....	50.3	85.7	3.8	2.2	3.0
102. ton.....	45.3	81.4	4.0	2.5	3.2
103. tout (adj.).....	94.6	95.7	1.4	1.3	1.3
104. trois.....	96.1	98.6	1.2	0.5	0.8
105. tu.....	82.8	95.7	2.4	1.3	1.8
106. valoir.....	9.0	20.0	5.8	5.0	5.4
107. verre.....	36.6	67.1	4.3	3.1	3.7
108. vie.....	65.6	92.9	3.2	1.6	2.4
109. vieux.....	72.5	95.7	2.9	1.3	2.1
110. voici.....	68.9	78.6	3.1	2.6	2.8
111. voix.....	57.8	88.6	3.5	2.0	2.7
112. voyage.....	96.7	98.6	1.1	0.5	0.8

TABLE II—CONTINUED

List 3	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
1. affaire.....	88.6	90.8	2.0	1.8	1.9
2. ainsi.....	43.0	66.1	4.1	3.2	3.6
3. amuser.....	98.4	94.7	0.6	1.4	1.0
4. année.....	83.2	84.4	2.4	2.3	2.3
5. apporter.....	81.6	85.3	2.5	2.3	2.4
6. argent.....	95.7	99.1	1.3	0.3	0.8
7. attendre.....	55.0	84.4	3.6	2.3	2.9
8. autant.....	19.5	30.3	5.1	4.6	4.8
9. avant.....	62.1	89.9	3.3	1.9	2.6
10. beaucoup.....	93.6	95.4	1.5	1.3	1.4
11. billet.....	54.1	92.7	3.6	1.6	2.6
12. bois.....	67.9	95.4	3.1	1.3	2.2
13. bruit.....	53.4	80.7	3.7	2.5	3.1
14. car.....	55.9	83.5	3.6	2.4	3.0
15. celui.....	48.2	45.9	3.9	4.0	3.9
16. chambre.....	93.6	99.1	1.5	0.3	0.9
17. chapeau.....	93.4	98.2	1.6	0.7	1.1
18. cher.....	92.9	99.1	1.6	0.3	0.9
19. chien.....	88.2	94.2	2.0	1.5	1.7
20. cinquante.....	57.5	77.1	3.5	2.7	3.1
21. combien.....	83.4	85.3	2.4	2.3	2.3
22. comprendre.....	77.0	94.5	2.7	1.4	2.0
23. continuer.....	96.6	99.1	1.1	0.3	0.7
24. coup.....	25.4	61.5	4.8	3.4	4.1
25. couteau.....	37.5	45.9	4.3	4.0	4.1
26. croire.....	22.9	85.3	4.9	2.3	3.6
27. décider.....	95.5	100.0	1.3	0.0	0.6
28. demain.....	67.0	93.6	3.1	1.5	2.3
29. dernier.....	47.9	91.6	3.9	1.8	2.8
30. deux.....	98.2	99.1	0.7	0.3	0.5
31. devoir.....	67.4	68.8	3.1	3.1	3.1
32. dormir.....	59.3	94.5	3.5	1.4	2.4
33. école.....	97.0	95.4	1.0	1.3	1.1
34. en (adv.).....	37.7	43.1	4.3	4.1	4.2
35. enfin.....	46.9	83.5	3.9	2.4	3.1
36. envoyer.....	39.1	75.2	4.2	2.8	3.5
37. étudier.....	94.3	99.1	1.5	0.3	0.9
38. famille.....	88.2	95.4	2.0	1.3	1.6

TABLE II—CONTINUED

List 3—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
39. feu.....	52.7	90.8	3.7	1.8	2.7
40. finir.....	94.8	97.2	1.4	1.0	1.2
41. fou, fol.....	28.9	71.6	4.6	3.0	3.8
42. frère.....	95.7	99.1	1.3	0.3	0.8
43. garçon.....	98.8	100.0	0.4	0.0	0.2
44. grand.....	97.8	100.0	0.9	0.0	0.4
45. haut.....	70.0	91.7	3.0	1.7	2.3
46. hiver.....	86.6	91.7	2.2	1.7	1.9
47. ici.....	95.9	96.3	1.2	1.2	1.2
48. jardin.....	98.4	96.3	0.6	1.2	0.9
49. jouer.....	80.0	88.1	2.6	2.1	2.3
50. la.....	81.6	81.6	2.5	2.5	2.5
51. langue.....	86.6	92.7	2.2	1.6	1.9
52. lequel.....	54.5	74.3	3.6	2.8	3.2
53. lieu.....	6.8	32.1	6.0	4.5	5.2
54. livre.....	95.2	98.2	1.3	0.7	1.0
55. lorsque.....	31.8	54.1	4.5	3.6	4.0
56. main.....	85.9	100.0	2.2	0.0	1.1
57. maître.....	47.3	84.4	3.9	2.3	3.1
58. matin.....	95.0	99.1	1.4	0.3	0.8
59. même.....	80.9	93.5	2.5	1.6	2.0
60. mettre.....	36.8	87.2	4.3	2.1	3.2
61. minuit.....	13.6	45.0	5.4	4.0	4.7
62. mois.....	53.5	86.2	3.7	2.2	2.9
63. monter.....	81.1	62.4	2.5	3.3	2.9
64. mort.....	80.0	89.9	2.6	1.9	2.2
65. neige.....	82.4	89.0	2.4	2.0	2.2
66. nom.....	86.1	98.2	2.2	0.7	1.4
67. nous.....	91.1	94.5	1.8	1.4	1.6
68. obéir.....	72.7	91.7	2.9	1.7	2.3
69. onze.....	81.8	93.5	2.5	1.6	2.0
70. ordre.....	51.4	47.7	3.7	3.9	3.8
71. oui.....	97.0	98.2	1.0	0.7	0.8
72. papier.....	99.0	100.0	0.3	0.0	0.1
73. parler.....	98.6	100.0	0.5	0.0	0.2
74. pas (adv.).....	82.0	93.6	2.4	1.5	1.9
75. payer.....	86.4	95.4	2.2	1.3	1.7

TABLE II—CONTINUED

List 3—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
76. père.....	99.0	98.2	0.3	0.7	0.5
77. personne (pron.).....	48.2	71.6	3.9	3.0	3.4
78. pied.....	74.1	85.3	2.8	2.3	2.5
79. plume.....	95.0	100.0	1.4	0.0	0.7
80. point (n.).....	47.5	68.8	3.9	3.1	3.5
81. pourquoi.....	92.5	96.3	1.7	1.2	1.4
82. prendre.....	47.3	90.8	3.9	1.8	2.8
83. printemps.....	66.8	72.5	3.2	2.9	3.0
84. quand.....	95.5	99.1	1.3	0.3	0.8
85. quelque.....	61.1	67.9	3.4	3.1	3.2
86. quitter.....	57.0	86.2	3.0	2.2	2.6
87. regarder.....	92.9	99.1	1.6	0.3	0.9
88. remercier.....	71.1	89.9	3.0	1.9	2.4
89. rester.....	52.9	82.6	3.7	2.4	3.0
90. rien.....	68.2	89.9	3.1	1.9	2.5
91. rue.....	87.0	94.5	2.1	1.4	1.7
92. savoir.....	57.9	94.5	3.5	1.4	2.4
93. sembler.....	40.9	85.3	4.1	2.3	3.2
94. seul.....	61.8	97.2	3.4	1.0	2.2
95. soie.....	40.9	56.0	4.1	3.6	3.8
96. sortir.....	53.9	85.3	3.7	2.3	3.0
97. sourire.....	10.4	50.5	5.7	3.8	4.7
98. suffire.....	9.8	10.2	5.7	5.7	5.7
99. surtout.....	19.7	69.7	5.1	3.0	4.0
100. tard.....	83.4	94.5	2.4	1.4	1.9
101. tête.....	75.4	98.2	2.8	0.7	1.7
102. toujours.....	81.6	94.5	2.5	1.4	1.9
103. traduire.....	30.7	68.8	4.5	3.1	3.8
104. troisième.....	58.2	81.7	3.5	2.5	3.0
105. un.....	98.0	96.3	0.8	1.2	1.0
106. vendre.....	75.2	86.2	2.8	2.2	2.5
107. vers.....	41.1	79.8	4.1	2.6	3.3
108. ville.....	87.0	90.8	2.1	1.8	1.9
109. visite.....	79.1	92.7	2.6	1.6	2.1
110. voilà.....	69.5	76.1	3.0	2.8	2.9
111. votre.....	89.1	94.5	2.0	1.4	1.7
112. vrai.....	70.9	93.5	3.0	1.6	2.3

TABLE II—CONTINUED

List 4	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
1. afin que.....	22.0	23.2	4.9	4.9	4.9
2. aller.....	98.8	100.0	0.4	0.0	0.2
3. an.....	52.9	70.4	3.7	3.0	3.3
4. apercevoir.....	74.7	92.0	2.8	1.7	2.2
5. apprendre.....	29.0	52.8	4.6	3.7	4.1
6. arrêter.....	64.9	93.6	3.2	1.5	2.3
7. aujourd'hui.....	92.9	98.4	1.6	0.6	1.1
8. autour.....	36.5	78.4	4.3	2.6	3.4
9. avec.....	98.4	100.0	0.6	0.0	0.3
10. besoin.....	51.0	78.4	3.8	2.6	3.2
11. blanc.....	96.7	100.0	1.1	0.0	0.5
12. bon.....	98.0	97.6	0.8	0.9	0.8
13. ça.....	41.7	76.8	4.1	2.7	3.4
14. ce.....	90.9	96.8	1.8	1.1	1.4
15. cent.....	81.5	97.6	2.5	0.9	1.7
16. chaise.....	72.4	92.0	2.9	1.7	2.3
17. chaque.....	53.7	90.4	3.7	1.9	2.8
18. chercher.....	76.1	95.2	2.8	1.3	2.0
19. choisir.....	84.4	97.6	2.3	0.9	1.6
20. clair.....	71.8	96.8	2.9	1.1	2.0
21. comme.....	74.7	95.2	2.8	1.3	2.0
22. conduire.....	46.3	83.6	3.9	2.4	3.1
23. corps.....	72.4	93.6	2.9	1.5	2.2
24. couper.....	45.7	79.2	4.0	2.6	3.3
25. couvrir.....	48.9	88.8	3.8	2.0	2.9
26. dame.....	92.9	95.2	1.6	1.3	1.4
27. défendre.....	92.1	97.6	1.7	0.9	1.3
28. demander.....	98.0	99.2	0.8	0.2	0.5
29. derrière.....	58.3	76.0	3.5	2.8	3.1
30. deuxième.....	68.3	84.4	3.1	2.3	2.7
31. difficile.....	94.6	97.6	1.4	0.9	1.1
32. doux.....	36.1	72.8	4.3	2.9	3.6
33. écrire.....	80.5	99.2	2.5	0.2	1.3
34. en (prep.).....	56.6	85.6	3.6	2.2	2.9
35. entendre.....	59.5	84.8	3.4	2.2	2.8
36. espérer.....	56.8	92.0	3.5	1.7	2.6
37. faim.....	50.2	62.0	3.8	3.3	3.5
38. femme.....	92.1	97.6	1.7	0.9	1.3

TABLE II—CONTINUED

List 4—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
39. fille.....	99.0	100.0	0.3	0.0	0.1
40. fleur.....	88.4	95.2	2.0	1.3	1.6
41. frais.....	37.1	72.0	4.3	2.9	3.6
42. froid.....	87.8	100.0	2.1	0.0	1.0
43. gauche.....	59.5	82.0	3.4	2.4	2.9
44. gros.....	88.0	96.0	2.1	1.2	1.6
45. heure.....	90.3	98.4	1.9	0.6	1.2
46. histoire.....	98.6	98.4	0.5	0.6	0.5
47. il.....	97.8	98.4	0.8	0.6	0.7
48. je.....	98.8	98.4	0.4	0.6	0.5
49. jour.....	96.3	98.4	1.2	0.6	0.9
50. là.....	90.0	92.2	1.9	1.7	1.8
51. le (pron.).....	73.4	76.0	2.9	2.8	2.8
52. lettre.....	96.3	100.0	1.2	0.0	0.6
53. ligne.....	42.7	87.2	4.1	2.1	3.1
54. loi.....	12.7	38.4	5.5	4.2	4.8
55. lui.....	90.0	96.0	1.9	1.2	1.5
56. maintenant.....	95.9	99.2	1.2	0.2	0.7
57. mal (adv.).....	64.3	86.4	3.3	2.2	2.8
58. mauvais.....	79.4	79.2	2.6	2.6	2.6
59. mener.....	21.4	46.4	5.0	3.9	4.4
60. midi.....	60.8	86.4	3.4	2.2	2.8
61. moi.....	88.8	92.0	2.0	1.7	1.8
62. mon.....	88.0	89.4	2.1	1.9	2.0
63. montre.....	46.3	59.2	3.9	3.5	3.7
64. mot.....	64.9	98.4	3.2	0.6	1.9
65. neuf (no.).....	87.6	95.2	2.1	1.3	1.7
66. non.....	92.9	97.6	1.6	0.9	1.2
67. nouveau.....	82.8	96.8	2.4	1.1	1.7
68. œil.....	61.6	88.8	3.4	2.0	2.7
69. or.....	46.3	73.6	3.9	2.9	3.4
70. où.....	85.9	88.0	2.2	2.1	2.1
71. ouvert.....	58.5	88.0	3.3	2.1	2.7
72. par.....	63.9	91.4	3.3	1.8	2.5
73. parmi.....	24.9	62.0	4.8	3.3	2.0
74. pas (n).....	16.6	59.2	5.2	3.5	4.3
75. pays.....	67.4	96.8	3.1	1.1	2.1

TABLE II—CONTINUED

List 4—Continued	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
76. perdre.....	55.6	84.4	3.6	2.3	2.9
77. petit (adj.).....	99.6	99.2	0.0	0.2	0.1
78. plaire.....	35.3	80.0	4.4	2.6	3.5
79. plus.....	90.7	96.0	1.8	1.2	1.5
80. porte.....	75.1	85.6	2.8	2.2	2.5
81. pourvu que.....	7.7	20.0	5.9	5.0	5.4
82. près de.....	66.4	87.2	3.2	2.1	2.6
83. professeur.....	96.6	98.4	1.1	0.6	0.8
84. quart.....	52.1	68.0	3.7	3.1	3.4
85. question.....	98.6	98.4	0.5	0.6	0.5
86. quoi.....	57.7	83.6	3.5	2.4	2.9
87. règle.....	36.5	66.0	4.3	3.2	3.7
88. remplir.....	37.6	67.2	4.3	3.1	3.7
89. réussir.....	21.8	39.2	5.0	4.2	4.6
90. rire.....	47.7	88.0	3.9	2.1	3.0
91. salle.....	84.6	92.2	2.3	1.7	2.0
92. se.....	45.9	55.2	4.0	3.6	3.8
93. sentir.....	14.1	64.0	5.4	3.3	4.3
94. seulement.....	54.1	79.2	3.6	2.6	3.1
95. soif.....	19.5	34.4	5.1	4.4	4.7
96. son (poss. adj.).....	91.3	96.8	1.8	1.1	1.4
97. sous.....	53.3	83.2	3.7	2.4	3.0
98. suite.....	23.0	32.0	4.9	4.5	4.7
99. table.....	98.8	98.4	0.4	0.6	0.5
100. te.....	56.0	73.6	3.6	2.9	3.2
101. toi.....	51.6	66.0	3.7	3.2	3.4
102. tort.....	15.8	50.4	5.3	3.8	4.5
103. travail.....	67.6	91.2	3.1	1.8	2.4
104. trop.....	59.1	76.0	3.5	2.8	3.1
105. utile.....	57.0	72.0	3.5	2.9	3.2
106. venir.....	73.0	96.8	2.9	1.1	2.0
107. vert.....	71.0	93.6	3.0	1.5	2.2
108. vin.....	64.9	95.2	3.2	1.3	2.2
109. vite.....	51.5	83.2	3.7	2.4	3.0
110. voir.....	83.6	99.2	2.4	0.2	1.3
111. vouloir.....	71.6	93.6	3.0	1.5	2.2
112. y.....	77.6	86.4	2.7	2.2	2.4

From the total list of 448 words a selection was made by eliminating all those words which were never missed by either first- or second-year pupils, those whose meanings are readily inferred from the English correspondents, those which showed inversions, being translated correctly more often by first-year pupils than by second-year pupils, and those words which experience had shown were troublesome for one reason or another to score. This reduced the list to 240 words which were grouped into four sixty-word standard vocabulary tests of equal difficulty. These tests with the weights to be given each word and the sum of the scale values are as follows:

FRENCH VOCABULARY TESTS²

A		B		C		D	
aujourd'hui	1.1	acheter	1.2	soleil	1.6	autre	1.4
chose	1.7	chien	1.7	alors	1.7	choisir	1.6
nouveau	1.7	rue	1.7	tête	1.7	vingt	1.7
porter	1.9	tard	1.9	crier	1.9	sans	1.8
hiver	1.9	toujours	1.9	parmi	2.0	chercher	2.0
onze	2.0	salle	2.0	frapper	2.0	compre- dre	2.0
venir	2.0	même	2.0	pays	2.1	fort	2.1
vieux	2.1	vivre	2.1	apercevoir	2.2	guerre	2.1
mille	2.1	où	2.1	partir	2.2	morceau	2.2
vert	2.2	permettre	2.2	neige	2.2	mort	2.2
vouloir	2.2	bois	2.2	arrêter	2.3	vin	2.2
année	2.3	hier	2.3	obéir	2.3	lever	2.2
haut	2.3	soir	2.3	demain	2.3	jouer	2.3
semaine	2.3	connaître	2.3	comment	2.4	combien	2.3
meilleur	2.4	ouvrir	2.4	ni	2.4	promener	2.4
apporter	2.4	travail	2.4	savoir	2.4	quinze	2.4
dormir	2.4	cela	2.5	champ	2.4	remercier	2.4
vie	2.4	noir	2.5	ciel	2.5	ne	2.4
lire	2.4	sucré	2.5	rien	2.5	après	2.5
devant	2.5	vendre	2.5	viande	2.5	pied	2.5
lait	2.5	coucher	2.6	billet	2.5	par	2.5
vache	2.5	droit	2.6	mauvais	2.6	porte	2.5
déjà	2.6	près de	2.6	pouvoir	2.6	avant	2.6
quitter	2.6	chemin	2.7	deuxième	2.7	espérer	2.6
bras	2.7	œil	2.7	mourir	2.7	feu	2.7
on	2.7	voix	2.7	courir	2.7	chaque	2.8
ouvert	2.7	entendre	2.8	côté	2.8	chaud	2.8
jeter	2.8	mer	2.8	midi	2.8	moins	2.8

² These tests can be procured from the writer, University of Wisconsin, Madison, Wisconsin.

FRENCH VOCABULARY TESTS—CONTINUED

A		B		C		D	
mois	2.9	dernier	2.8	voici	2.8	couvrir	2.9
oublier	2.9	perdre	2.9	quoi	2.9	tante	2.9
gauche	2.9	attendre	2.9	vent	2.9	voilà	2.9
mieux	2.9	laisser	2.9	assez	3.0	ceci	3.0
rester	3.0	printemps	3.0	car	3.0	fin	3.0
rire	3.0	sortir	3.0	gens	3.0	souvent	3.0
chacun	3.1	vite	3.0	sous	3.0	troisième	3.0
seulement	3.1	bruit	3.1	tenir	3.0	devoir	3.0
conduire	3.1	pendant	3.1	enfin	3.1	cinquante	3.1
quelque	3.2	trop	3.1	maître	3.1	ligne	3.1
rendre	3.2	mettre	3.2	derrière	3.1	besoin	3.2
sembler	3.2	ton	3.2	lit	3.2	lequel	3.2
gagner	3.3	entre	3.3	utile	3.2	voiture	3.2
ou	3.3	partie	3.3	couper	3.3	an	3.3
cependant	3.4	ça	3.4	plusieurs	3.3	vers	3.3
plein	3.4	or	3.4	boire	3.4	autour	3.4
ordonner	3.5	faim	3.5	puis	3.4	suivre	3.4
plaire	3.5	presque	3.5	envoyer	3.5	depuis	3.6
ainsi	3.6	peur	3.6	croire	3.6	doux	3.6
rentrer	3.6	fer	3.6	frais	3.6	montre	3.7
oreille	3.7	pleurer	3.7	bientôt	3.7	règle	3.7
chez	3.8	verre	3.7	prêt	3.7	remplir	3.7
dont	3.8	fou, fol	3.8	sauver	3.7	traduire	3.8
lorsque	4.0	journée	4.0	soie	3.8	bout	3.9
soulier	4.0	surtout	4.0	tant	3.9	apprendre	4.1
paraître	4.2	loin	4.2	craindre	4.2	couteau	4.1
déjeuner	4.2	falloir	4.3	sentir	4.3	coup	4.1
aussitôt	4.5	court	4.4	mener	4.4	devenir	4.4
moindre	4.5	tort	4.5	réussir	4.6	nul	4.6
autant	4.8	sourire	4.7	soif	4.7	minuit	4.7
lien	5.2	quoique	5.0	afin que	4.9	loi	4.8
valoir	5.4	appartenir	5.3	pourvu que	5.3	suffire	5.7
179.6		179.6		179.6		179.4	

Tables III and IV give the results with these tests for sixteen schools in terms of the number right and the sum of the scale values.

TABLE III. NUMBER CORRECT

Test	Years of Instruction in French				
	0.5	1.0	1.5	2.0	3.0
A	22.1	32.4	45.4	47.6	53.3
B	25.7	32.6	44.9	47.8	53.5
C	22.4	31.6	42.2	46.6	52.3
D	29.3	32.7	43.7	47.0	52.6
Average	24.9	32.3	44.1	47.2	52.9

TABLE IV. SUM OF SCALE VALUES

Test	Years of Instruction in French				
	0.5	1.0	1.5	2.0	3.0
A	59.1	87.1	124.6	132.8	154.7
B	69.3	87.2	124.5	134.8	156.1
C	60.5	86.4	114.2	131.1	150.7
D	77.0	87.7	121.3	132.3	151.1
Average	66.5	87.1	121.1	132.7	153.1

Tentative standard scores for the four vocabulary tests are, therefore, as given in Table V.

TABLE V. AVERAGE OF SCORES FOR THE FOUR TESTS

	Years of Instruction in French				
	0.5	1.0	1.5	2.0	3.0
Number correct	25	32	44	47	53
Sum of scale values	66	87	121	133	153

When the tests are given the score may simply be represented by the number of words correct. It is more accurate, however,

to give the weight or scale value for each correct word and take the sum of the scale values as the score.

SENTENCE TESTS

Seventy-five sentences, containing no words not in the list of 448 common to all the first year, were selected or constructed and arranged in five sentence tests of as nearly equal difficulty as could be estimated. A large number of sentences were selected from exercise and composition books used with first- and second-year pupils. The sentences were selected in this way in order that tests which might be developed would be based upon the sort of material the pupils are usually called upon to work with, and, moreover, such material would lend itself readily to the development of construction or grammar tests.

Table VI gives the results obtained from these seventy-five sentences in eighteen schools distributed widely over the country. As before the average and median scores are given and the number of pupils. While the tests were given to half-year, year-and-a-half, and three-year pupils, the results are not used in the calculation of scale values.

TABLE VI. RESULTS FOR THE SEVENTY-FIVE SENTENCES ARE ARRANGED IN THE ORIGINAL FIVE SENTENCE TESTS. ALL SCHOOLS COMBINED

TESTS	FIRST-YEAR PUPILS			SECOND-YEAR PUPILS		
	No. of Pupils	Averages	Medians	No. of Pupils	Averages	Medians
I	488	7.8	8.3	88	10.7	11.8
II	474	7.0	7.4	103	10.4	11.5
III	414	7.0	7.5	116	10.5	10.9
IV	507	7.6	7.9	132	10.0	10.8
V	408	7.8	8.9	125	12.3	12.5

Table VII gives (a) the percent of times each of the seventy-five sentences is correctly translated by first- and second-year pupils; (b) the year scale values (derived by the same method as was used with vocabularies described above); and (c) the general scale value or weight to be assigned to each sentence.

TABLE VII. THE SEVENTY-FIVE SENTENCES GIVEN TO FIRST- AND SECOND-YEAR PUPILS

	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
1. J'ai un frère.....	96.3	96.6	1.2	1.1	1.1
2. Ce livre est petit.....	97.5	100.0	0.9	0.0	0.4
3. Il n'a pas d'argent.....	90.4	89.8	1.9	1.9	1.9
4. La jeune fille a les yeux bleus.....	95.1	95.5	1.4	1.3	1.3
5. J'y suis allé ce matin.....	43.4	65.8	4.0	3.2	3.6
6. Il vient de vendre ce cheval quatre cents francs.....	11.1	37.5	5.6	4.3	4.9
7. On trouve que la vie est chère dans les grandes villes.....	73.9	89.8	2.9	1.9	2.4
8. Il mangea très peu quoiqu'il eût faim.....	25.8	51.1	4.8	3.8	4.3
9. Reste avec nous où il fait chaud.....	53.5	81.8	3.7	2.5	3.1
10. Il l'a fait sans qu'on le lui ait dit.....	19.7	44.3	5.1	4.0	4.5
11. J'ai dû partir sans vous attendre.....	17.0	48.8	5.2	3.8	4.5
12. Si vous connaissez ce monsieur qui vient d'arriver, dites-moi son nom.....	25.4	56.8	4.8	3.5	4.1
13. Elles se parlent l'une à l'autre.....	48.7	67.0	3.8	3.1	3.4
14. Je l'ai vu il y a quelques heures.....	34.2	68.2	4.4	3.1	3.7
15. Aussitôt qu'il a eu fini son travail, ses amis sont arrivés.....	52.9	78.4	3.7	2.6	3.1
16. C'est vrai.....	85.4	94.2	2.2	1.5	1.8
17. Le chien est l'ami de l'homme.....	95.3	97.1	1.3	1.0	1.1
18. Il est difficile de faire cela.....	86.0	90.3	2.2	1.9	2.0
19. Quel est le livre que vous avez à la main?....	93.2	98.1	1.6	0.7	1.1
20. Je ne le dirai pas à vous.....	48.6	82.5	3.9	2.4	3.1
21. C'est pourquoi nous ne sommes pas allés sur l'eau.....	50.7	79.6	3.8	2.6	3.2
22. J'ai déjà été le voir.....	61.3	85.4	3.4	2.2	2.8
23. Il devait arriver hier.....	29.6	63.1	4.6	3.3	3.9
24. Qu'est-ce que ça veut dire?.....	10.0	31.1	5.7	4.5	5.1
25. Je ne crains pas qu'il ne soit pas venu.....	15.2	39.8	5.3	4.2	4.7
26. Il y a un mois que je le connais.....	10.4	32.0	5.7	4.5	5.1
27. Il a de son côté quelque chose à dire, il me semble.....	23.9	68.0	4.9	3.1	4.0
28. S'il a le temps, dites-lui d'y aller.....	54.1	83.5	3.6	2.4	3.0
29. Qui pourra le sauver si ce n'est ses amis.....	24.5	54.4	4.8	3.6	4.2
30. Et quand cela aurait été vrai, je ne l'aurais pas dit.....	15.9	40.8	5.3	4.1	4.7

TABLE VII—CONTINUED

	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
31. Il est heureux.....	91.6	93.9	1.8	1.5	1.6
32. Le vent et la neige sont arrivés.....	86.9	92.2	2.1	1.7	1.9
33. Oui, maintenant il y est.....	75.4	87.1	2.8	2.1	2.4
34. Je suis ici depuis trois jours.....	34.8	67.2	4.4	3.1	3.7
35. Je n'ai parlé à personne.....	83.6	92.2	2.4	1.7	2.0
36. Vous écrirez ce qu'il vous plaira.....	21.9	64.7	5.0	3.2	4.1
37. Il me l'a dit lui-même.....	50.2	82.7	3.9	2.4	3.1
38. J'ai peur qu'il ne vienne.....	6.3	12.9	6.1	5.5	5.8
39. Je vous donnerai ce dont vous avez besoin...	60.1	83.6	3.4	2.4	2.9
40. Je ne sais pas pourquoi nos amis ne sont pas encore revenus.....	61.1	87.1	3.4	2.1	2.7
41. Je resterai ici pour qu'ils puissent me trouver	50.2	80.2	3.8	2.5	3.1
42. Si je m'en vais, ce n'est pas que je veuille vous quitter.....	21.5	58.6	5.0	3.5	4.2
43. Ils ont dit qu'ils me feraient savoir quand ils arriveraient.....	30.0	73.3	4.6	2.9	3.7
44. Le soleil se lève de très bon matin et couche si tard que, à huit heures, il fait encore jour	20.5	71.5	5.0	3.0	4.0
45. Peu s'en faut qu'il ne le fasse.....	9.4	6.0	5.8	6.1	5.9
46. Qui est là?.....	92.3	95.4	1.7	1.3	1.5
47. La nuit tombe.....	83.0	89.4	2.4	1.9	2.1
48. Je suis votre ami, n'est-ce pas?.....	97.4	99.2	0.9	0.2	0.5
49. Il est difficile de lui plaire.....	61.3	81.1	3.4	2.5	2.9
50. Est-ce qu'il n'est pas ici?.....	77.3	84.1	2.7	2.3	2.5
51. Cette montre vaut vingt francs.....	44.0	72.7	4.0	2.9	3.4
52. Il a perdu son chemin.....	51.9	84.9	3.8	2.3	3.0
53. Combien y a-t-il d'ici à votre maison?....	29.2	33.3	4.6	4.4	4.5
54. Avez-vous jamais vu quelque chose d'aussi beau?.....	54.8	82.6	3.6	2.4	3.0
55. Je comprends maintenant que c'était mon devoir.....	20.9	59.1	5.0	3.5	4.2
56. Il s'y trouve de belles choses.....	9.1	3.8	5.8	6.4	6.1
57. On m'a dit que ce n'est pas vrai.....	73.8	90.9	2.9	1.8	2.3
58. Il viendra pourvu qu'il ne fasse pas froid....	10.8	22.0	5.6	4.9	5.2
59. J'irai le trouver si vous n'y allez vous-même.	41.8	65.1	4.1	3.2	3.6
60. Faites semblant d'être content afin que les autres n'aient pas peur.....	9.7	40.9	5.7	4.1	4.9

TABLE VII—CONTINUED

	Percents Correct		Year Scale Values		General Scale Values
	I	II	I	II	
61. La mère aime l'enfant.....	84.6	96.0	2.3	1.2	1.7
62. Mon travail est fini.....	83.1	94.4	2.4	1.4	1.9
63. Ils sont à l'école.....	88.7	97.6	2.0	0.9	1.4
64. Tout le monde est ici aujourd'hui.....	88.5	96.8	2.0	1.1	1.5
65. Il doit arriver demain.....	33.3	73.6	4.4	2.9	3.6
66. Cet arbre est plus haut que le nôtre.....	67.2	91.2	3.1	1.8	2.4
67. Il paraît qu'il est mort.....	12.8	70.4	5.5	3.0	4.2
68. Voilà ce qui me plaît.....	62.2	88.0	3.3	2.1	2.7
69. Je cherche un pays où je puisse être libre....	47.8	92.8	3.9	1.6	2.7
70. J'ai peu dormi cette nuit.....	41.7	66.4	4.1	3.2	3.6
71. Si vous étiez resté ici, j'aurais été content....	38.2	73.6	4.2	2.9	3.5
72. Que ne lui avez-vous dit tout ce qui s'est passé?.....	15.7	46.4	5.3	3.9	4.6
73. Ne vous semble-t-il pas qu'il est fou?.....	23.5	73.6	4.9	2.9	3.9
74. Je ne veux pas qu'il y aille.....	38.1	80.8	4.2	2.5	3.4
75. Il leur a demandé de l'argent, mais ils ne lui ont rien donné.....	62.0	90.4	3.3	1.9	2.6

The sentences were then rearranged into six standard sentence tests of twelve sentences each of approximately equal difficulty. The tests are as follows:

FRENCH SENTENCE TEST I

1. Je suis votre ami, n'est-ce pas?.....	0.5
2. Quel est le livre que vous avez à la main?.....	1.1
3. Tout le monde est ici aujourd'hui.....	1.5
4. Il est difficile de faire cela.....	2.0
5. Il leur a demandé de l'argent, mais ils ne lui ont rien donné.....	2.6
6. Reste avec nous où il fait chaud.....	3.1
7. J'y suis allé ce matin.....	3.6
8. Vous écrirez ce qu'il vous plaira.....	4.1
9. Que ne lui avez-vous dit tout ce qui s'est passé?.....	4.6
10. Qu'est-ce que ça veut dire?.....	5.1
11. J'ai peur qu'il ne vienne.....	5.8
12. Il s'y trouve de belles choses.....	6.1

40.1

FRENCH SENTENCE TEST II

1. Le chien est l'ami de l'homme.....	1.1
2. Qui est là?.....	1.5
3. Le vent et la neige sont arrivés.....	1.9
4. On m'a dit que ce n'est pas vrai.....	2.3
5. Je cherche un pays où je puisse être libre.....	2.7
6. Aussitôt qu'il a eu fini son travail, ses amis sont arrivés.....	3.1
7. Si vous étiez resté ici, j'aurais été content.....	3.5
8. Ne vous semble-t-il pas qu'il est fou?.....	3.9
9. Il mangea très peu quoiqu'il eût faim.....	4.3
10. Je ne crains pas qu'il ne soit pas venu.....	4.7
11. Il y a un mois que je le connais.....	5.1
12. Peu s'en faut qu'il ne le fasse.....	5.9
	<hr/>
	40.0

FRENCH SENTENCE TEST III

1. La jeune fille a les yeux bleus.....	1.3
2. La mère aime l'enfant.....	1.7
3. Je n'ai parlé à personne.....	2.0
4. On trouve que la vie est chère dans les grandes villes.....	2.4
5. J'ai déjà été le voir.....	2.8
6. C'est pourquoi nous ne sommes pas allés sur l'eau.....	3.2
7. J'irai le trouver si vous n'y allez vous-même.....	3.6
8. Il a de son côté quelque chose à dire, il me semble.....	4.0
9. Qui pourra le sauver si ce n'est ses amis.....	4.2
10. Il l'a fait sans qu'on le lui ait dit.....	4.5
11. Faites semblant d'être content afin que les autres n'aient pas peur.....	4.9
12. Il viendra pourvu qu'il ne fasse pas froid.....	5.2
	<hr/>
	39.8

FRENCH SENTENCE TEST IV

1. Ils sont à l'école.....	1.4
2. Mon travail est fini.....	1.9
3. Cet arbre est plus haut que le nôtre.....	2.4
4. Je ne sais pas pourquoi nos amis ne sont pas encore revenus.....	2.7
5. S'il a le temps, dites-lui d'y aller.....	3.0
6. Cette montre vaut vingt francs.....	3.4
7. J'ai peu dormi cette nuit.....	3.6
8. Il devait arriver hier.....	3.9
9. Il paraît qu'il est mort.....	4.2
10. J'ai dû partir sans vous attendre.....	4.5
11. Et quand cela aurait été vrai, je ne l'aurais pas dit.....	4.7
12. Il vient de vendre ce cheval quatre cents francs.....	4.9
	<hr/>
	40.6

FRENCH SENTENCE TEST V

1.	C'est vrai.....	1.8
2.	La nuit tombe.....	2.1
3.	Oui, maintenant il y est.....	2.4
4.	Voilà ce qui me plaît.....	2.7
5.	Je vous donnerai ce dont vous avez besoin.....	2.9
6.	Je resterai ici pour qu'ils puissent me trouver.....	3.1
7.	Je ne veux pas qu'il y aille.....	3.4
8.	Ils ont dit qu'ils me feraient savoir quand ils arriveraient.....	3.7
9.	Le soleil se lève de très bon matin et se couche si tard que, à huit heures, il fait encore jour.....	4.0
10.	Si vous connaissez ce monsieur qui vient d'arriver, dites-moi son nom.....	4.1
11.	Si je m'en vais, ce n'est pas que je veuille vous quitter.....	4.2
12.	Combien y a-t-il d'ici à votre maison?.....	4.5
		<hr/>
		38.9

FRENCH SENTENCE TEST VI

1.	Il n'a pas d'argent.....	1.9
2.	Est-ce qu'il n'est pas ici?	2.5
3.	Il est difficile de lui plaire.....	2.9
4.	Avez-vous jamais vu quelque chose d'aussi beau?.....	3.0
5.	Il a perdu son chemin.....	3.0
6.	Je ne le dirai pas à vous.....	3.1
7.	Il me l'a dit lui-même.....	3.1
8.	Elles se parlent l'une à l'autre.....	3.4
9.	Il doit arriver demain.....	3.6
10.	Je l'ai vu il y a quelques heures.....	3.7
11.	Je suis ici depuis trois jours.....	3.7
12.	Je comprends maintenant que c'était mon devoir.....	4.2
		<hr/>
		38.1

Table VIII gives the number correct with each of these tests and the sum of the scale values for one year, a year and one-half, two year, and three year pupils.

TABLE VIII. NUMBER CORRECT

Test	YEARS OF INSTRUCTION IN FRENCH			
	1.0	1.5	2.0	3.0
I	5.9	7.4	7.7	9.7
II	5.8	7.4	8.5	10.0
III	5.4	7.2	8.2	8.6
IV	5.2	7.3	8.7	10.4
V	5.7	7.5	9.0	10.5
VI	6.1	8.3	9.2	11.0
Average.....	5.7	7.5	8.5	10.0

TABLE IX. SUM OF SCALE VALUES

Test	YEARS OF INSTRUCTION IN FRENCH			
	1.0	1.5	2.0	3.0
I	12.7	17.3	18.8	28.1
II	14.1	19.6	23.2	30.5
III	14.0	20.0	23.6	29.0
IV	14.2	21.3	26.8	34.1
V	16.2	22.5	27.5	32.6
VI	18.1	26.0	30.0	33.7
Average.....	14.9	21.1	25.0	31.3

Tentative standard scores, disregarding the minor differences between the tests, would, therefore, be as follows:

TABLE X. AVERAGE OF SCORES FOR THE SIX TESTS

	YEARS OF INSTRUCTION IN FRENCH			
	1.0	1.5	2.0	3.0
Number correct.....	5.5	7.5	8.5	10.0
Sum of scale values.....	14.0	21.0	24.0	31.0

These scores are very reliable for the one year and two year pupils but less so for the year and a half and three year pupils.

THE OTIS GROUP INTELLIGENCE SCALE APPLIED TO THE ELEMENTARY-SCHOOL GRADUATING CLASSES OF OAKLAND, CALIFORNIA

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Both individual and group intelligence tests have been extensively used in the public schools of Oakland, California for a number of years. Their value as administrative tools is well established. They have contributed to a better understanding of many school problems such as retardation, elimination, and proper curriculum modification; and they have resulted in administrative adjustments leading to greater efficiency.

This article presents certain data from tests of 1,043 day elementary-school pupils who completed the eighth grade in Oakland, January, 1920. This includes all those graduated at that time except a small number who were absent from school the day the tests were given. The Otis Group Intelligence Scale, as abbreviated for use in Oakland, was employed in making the tests. The abbreviation omits tests 1, 6, 9, and 10. It includes tests 2, 3, 4, 5, 7, and 8 without modification as to directions for giving, timing, or scoring, except that tests 4 and 5 are given double value in the final score in order that they may contribute a greater amount to the final test result. The highest possible score with the abbreviated test is 175.

In order that the six-test scores obtained at Oakland may be compared with the scores arising from the use of the complete test, Dr. Arthur S. Otis, the deviser of the test, has furnished Table I. By its use a ten-test score may be transmuted into a six-test score.

The tens and hundreds digits of the six-test score are printed in italics in the line across the top; the units digits of the six-test score are printed in italics in the column at the left. To find the ten-test score corresponding to a known six-test score find in the body of the table the number under the tens digit (or tens and hundreds digits combined) and opposite the units digit. For ex-

TABLE I. A TABLE FOR TRANSMUTING TEN-TEST SCORES INTO SIX-TEST SCORES, OMITTING TESTS 1, 6, 9, AND 10. (OTIS GROUP INTELLIGENCE SCALE)

Units Digits of Six-test Score	Tens and Hundreds Digits of Six-test Score												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1	10	26	42	58	74	91	107	123	140	154	167	181	195
2	11	27	43	60	76	92	109	125	141	155	168	182	196
3	13	29	45	61	78	94	110	127	143	157	170	184	198
4	14	30	46	63	79	96	112	128	144	158	171	185	199
5	16	32	48	64	81	97	114	130	146	160	173	187	201
6	18	34	50	66	82	99	115	132	147	161	174	188	202
7	19	35	51	68	84	100	117	133	148	162	175	189	203
8	21	37	53	69	86	102	118	135	150	163	177	191	205
9	22	38	55	71	87	104	120	136	151	164	178	192	206
0	24	40	56	73	89	105	122	138	153	166	180	194	208

ample the following six-test scores correspond to the indicated ten-test scores:

Six-test Score	Ten-test Score
45.....	81
125.....	201
22.....	43
10.....	24
4.....	14

The tests were made in the school month just preceding the date of graduation. At the time of making the test, the following supplementary data were obtained for each child: name, age in years and months, date and hour of the test, and teachers' ratings in school work. Teachers were asked to rate pupils for general quality of school work on a scale of seven points as follows: (1) very superior; (2) superior; (3) slightly above average; (4) average; (5) slightly below average; (6) inferior; (7) very inferior.

When several teachers rated a child in school work, the average of their ratings was taken. If this resulted in a fraction, the child was assigned the rating of the nearest whole number. When the fraction was an even half, the rating was given the value of the

TABLE II. DISTRIBUTIONS OF SCORES MADE BY ELEMENTARY-SCHOOL GRADUATING CLASSES IN 29 SCHOOLS
OTIS GROUP INTELLIGENCE TEST—OAKLAND ABBREVIATION^a

Score	School																													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
Totals.....	15	24	17	15	37	49	48	9	30	16	27	36	38	28	17	42	34	24	25	26	41	33	67	51	22	26	138	70	1,043	
Medians.....	48	58	54	64	68	69	71	72	72	75	76	76	77	79	80	81	82	82	84	85	87	88	88	90	95	95	96	109	83	

[a] Read table as follows: In the eighth-grade class in school 1, one pupil made a score of 90-94, one scored 80-84, etc. There was a total of 15 graduating pupils in school 1, and they made a median score of 48. Similar data are given for the 28 other schools graduating eighth-grade pupils.

whole number farthest removed from the rating of 4. That is 3.5 was tabulated as 3, 4.5 as 5, etc. Succeeding paragraphs present and briefly point out the significance of the data resulting from the test and the collection of the supplementary information.

Table II gives distributions of scores made by graduating classes of the 29 schools of the city. A wide variation in capacity as measured by the test is shown both by different high eighth grades and by different individuals in the same class. Individual scores range from 14 to 152 points and class medians from 48 to 109. The significance of these differences can be better understood by consulting Figure 1. This compares the ranges of the middle 50 percents for four different groups: (1) the elementary graduating classes of the two schools making the highest medians; (2) a high ninth-grade class of average ability tested at about the same time as the elementary graduating classes; (3) the elementary graduating classes in the three schools making the lowest median scores; (4) two high sixth-grade classes recently tested.

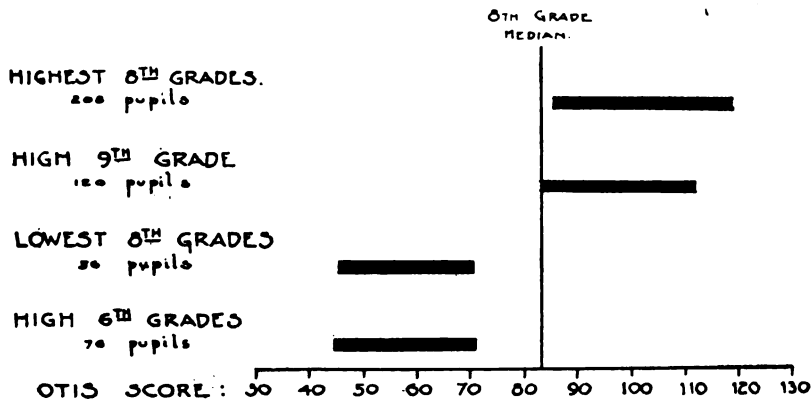


FIGURE 1. RANGE OF OTIS TEST SCORES
MIDDLE FIFTY PERCENT.

It is evident that ability as measured by the test in the eighth-grade classes in some of the schools is equal to that in a freshman class which has survived a year in high school and is just ready to begin sophomore work; while the ability found in other eighth grades is no better than that of groups of children who have not yet completed the sixth grade. If the test means anything in

terms of ability to do school work, certainly the actual accomplishments of the different classes graduating in January, 1920 must have varied widely.

These data show how important it is to know the character of the human material with which a teacher is working, before a judgment is passed on the results obtained. A poor teacher working with an eighth-grade class with the capacity of high-school freshmen might very easily get better results than a good teacher working with an eighth-grade class with a capacity not above that of the ordinary sixth grade. Teachers are too often judged wholly on a basis of results, whereas the important factor, the learning capacity of children, is given but little thought.

The necessity of making modifications in the curriculum to meet the varying abilities of different classes of the same grade designation, and of different individuals in the same class, is another point emphasized by the data of Table II.

Modifications certainly must be made either in the character of the curriculum or in the time given by different classes of the same grade to any particular block of subject-matter if proper consideration is to be given to the wide differences in capacity which the test reveals in grades of the same designation.

Table III gives the data concerning the relationship between test scores and ratings in school work. There is a positive correlation of 0.538 (Pearson formula). Even were the test perfect in its measurement of mental capacity, we should not expect a complete correlation between test scores and school work. Such factors as the following all tend to destroy correlation:

1. All children do not put forth equal effort; some of good native ability may do poor work due to lack of application, and some of poor native ability may compensate by unusual effort.
2. Repetition of grades sometimes brings up the school work of those of poor native ability.
3. Desirable or undesirable personal characteristics may unduly influence a teacher in her estimate of a child's work.
4. Different classes of the same grade vary so widely in general ability that the same score may represent high or low ability, according to the class in which it occurs.
5. In a small number of cases the test score is probably unduly influenced by extreme nervousness, illness, or other interfering factors.

TABLE III. OTIS SCALE SCORE AND RATING IN SCHOOL WORK^(a)

Score	School Work Rating							Totals
	7	6	5	4	3	2	1	
150	.....	.....	.....	.....	.....	1	.....	1
145	.....	.....	.....	.....	.....	1	1	2
140	.....	.....	.....	.....	2	.....	4	6
135	.....	.....	.....	.....	1	3	4	8
130	.....	.....	.....	4	1	3	2	10
125	.....	.....	1	4	9	6	1	21
120	.....	1	.....	5	10	10	1	27
115	.....	.....	3	7	21	8	2	41
110	.....	.....	.....	10	14	16	4	44
105	.....	1	3	11	21	7	.....	43
100	.....	1	12	25	17	8	.....	63
95	.....	1	6	29	12	7	2	57
90	.....	1	7	46	26	13	2	95
85	.....	1	9	34	23	9	.....	76
80	.....	1	13	32	15	12	.....	73
75	1	7	11	31	10	7	2	69
70	1	7	23	36	11	4	.....	82
65	4	7	23	20	11	3	2	70
60	2	8	12	28	11	.....	.....	61
55	1	8	21	11	6	1	.....	48
50	4	10	10	10	4	1	.....	39
45	2	9	6	5	9	.....	.....	31
40	1	4	6	3	.....	.....	.....	14
35	.....	6	1	2	.....	.....	.....	9
30	2	3	4	.....	1	.....	.....	10
25	.....	2	2	.....	.....	.....	.....	4
20	1	1	3	2	.....	.....	.....	7
15-19	.....	.....	1	.....	.....	.....	.....	1
10-14	.....	1	.....	.....	.....	.....	.....	1
Totals	19	80	177	355	235	120	27	1013 ^(b)
Median Scores	54	57	70	85	93	102	119	84

 $r = 0.538$.

[a] Read table as follows: Of the pupils rated 7 (very inferior) in school work one scored between 75 and 79; one scored between 70 and 74; etc. Of those rated 6 (inferior), one scored between 120 and 124; one between 105 and 109; etc.

[b] Thirty pupils included in Table II are omitted as they had not been in the Oakland schools a sufficient time to make it possible for teachers to rate them in school work.

6. The degree of homogeneity of the group tested is an important consideration in estimating the value of a correlation figure. The group dealt with here, high eight-grade children, is probably as homogeneous as is found in any grade.

But in spite of all these factors that tend to destroy correlation, the test score gives a good indication of the character of school work a child will do. Table IV, worked out on the percentage basis, is more conclusive on this point than the correlation figure. Of the fifty children composing the 5 percent making the highest test scores, none were rated 7 in school work, none were rated 6, 2 percent were rated 5 or below average, and the rest were rated average or above. School ratings for the other percentage groups are also given. These ratings show conclusively that the test score is a valuable indication of the type of work children do.

The data contained in Table V show the relation between chronological age and test scores for the 1,043 children. The younger children in the grade generally made the higher scores in the test. Those who were twelve years old made a median score of 110, and there was a marked drop in the median of each higher age group. In short, the bright children who learn rapidly and earn extra promotions made high scores on the test, while the over-age plodders, in spite of the extra years they have spent in school, show their mental inferiority by making low scores. Of the 44 children who were seventeen years of age, 82 percent made scores below the median for the whole group, while of those twelve years of age, 82 percent were above the median.

TABLE IV. OTIS SCALE SCORE AND RATING IN WORK IN PERCENTS^[a]

Percentile (Otis Scale)	School Work Rating ^[b]							Totals
	7	6	5	4	3	2	1	
95 to 100	0	0	2.0	18	26	30	24	100
85 to 95	0	0.9	1.9	18.8	43.5	30.6	3.9	99.6
65 to 85	0	1.4	12.3	40.3	28.0	15.2	2.4	99.6
35 to 65	0.6	3.2	14.1	46.0	23.0	11.5	1.3	99.1
15 to 35	2.9	11.3	28.5	36.4	15.7	3.4	0.9	99.1
5 to 15	6.9	22.7	29.7	21.7	17.8	0.9	0	99.7
0 to 5	7.8	37.2	35.2	17.6	1.9	0	0	99.7

[a] Read table as follows: of the highest 5 percent of the group according to Otis test scores, none were rated 7 in school work, none were rated 6, 2 percent were rated 5, etc.

[b] "1" in school work is very superior,

"2" in school work is superior,

"3" in school work is slightly above average, etc., see above.

TABLE V. OTIS GROUP INTELLIGENCE SCALE SCORE AND CHRONOLOGICAL AGE. 1,043 GRADUATING ELEMENTARY-SCHOOL CHILDREN^[a]

Score	Ages							Totals
	11 ^[b]	12	13	14	15	16	17	
150-159	1	.....	.....	.....	.....	.....	1
140-149	1	4	2	1	.....	.....	8
130-139	1	1	7	5	3	2	.....	19
120-129	1	13	22	9	3	.....	48
110-119	4	24	36	15	5	1	85
100-109	1	19	44	34	8	.....	106
90-99	3	23	54	56	14	4	154
80-89	2	30	52	52	12	4	152
70-79	1	15	53	57	28	5	159
60-69	1	7	42	46	27	8	131
50-59	4	24	31	24	9	92
40-49	11	24	13	5	53
30-39	2	8	7	4	21
20-29	4	2	4	2	12
10-19	2	2
Totals.....	1	16	146	351	338	147	44	1,043
Median Score....	134 ^[c]	110	94	84	80	70	60	83

$r = -0.44.$

[a] Read table as follows: One child aged eleven scored between 130 and 139; one aged twelve scored between 150 and 159; one aged fifteen scored between 140 and 149; etc.

[b] Age eleven includes those from ten years and six months to eleven years and five months; age twelve from eleven years and six months to twelve years and five months.

[c] Score of one case.

Figure 2 compares the range of the middle 50 percent of each age group. It would be hard to present data more conclusive than these regarding the value of the test as a measure of the capacity for accomplishment in school work as it is now constituted.

The administrative uses to which intelligence-test results may be put are many. They may be used in studying pupils in groups; that is, the human material in one school can be compared with that in another. The classes of the same grade and of different grades within a school can also be accurately measured as to general capacity. The group intelligence test has already been used

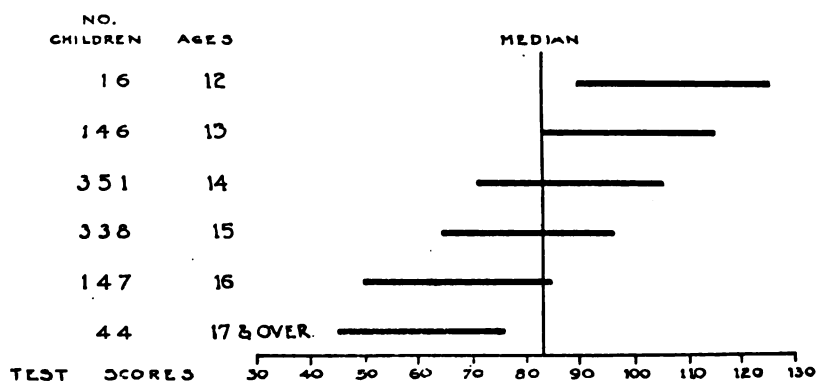


FIGURE 2. RANGE OF SCORES BY AGES
MIDDLE FIFTY PERCENT.

successfully in some of the Oakland schools as an aid in making pupil segregations on the basis of ability to do school work.

The test results are also of value in studying individual pupils. The results are not as reliable in the measurement of individuals as in the measurement of classes, but if they are used cautiously, they are sufficiently accurate to render valuable information concerning individual pupils. Following are some of the ways in which test scores may be used in dealing with individual pupils:

1. A low score may help to confirm a teacher's judgment that a child's failure in school is due to inferior capacity. Special steps can then be taken to insure the best development of what ability the child is found to possess.

2. A high score associated with poor school work should call for special study. The child may be failing because of lack of application; or such factors as excessive diffidence, poor sight, defective hearing, or bad home conditions may explain why a child sometimes makes a high score and yet does poor school work. At any rate, all such cases are worth careful investigation to see if conditions cannot be remedied so that the child will work up to capacity. Cases are already on record in the Oakland schools where the attitude of a child toward school and the character of his school work have both been greatly improved as a result of a special case study made after a group test had been given.

3. The test scores often indicate that children should be considered for extra promotions. When a child makes an exception-

ally high score, and it is the judgment of his teachers that he is capable of doing work in a higher grade, he should be carefully studied with a view to advancement. If no good reasons seem to exist why he should not be put ahead, he should receive the extra promotion, due provision being made on account of it for the extra help he will need. On the other hand, when a child's test score and school work seem to agree, there is reason for satisfaction that the school is accomplishing what it should.

4. Test scores are valuable to teachers in educational and vocational counseling. It is only on the basis of exact knowledge that any effective advice can be given to children concerning their future educational and occupational careers. The intelligence test is one of several "lines" on a pupil's characteristics which a school counselor should have at hand when advising him.

5. The whole question of the differentiation of the curriculum in terms of the capacity and needs of pupils is one in which test results can lend valuable aid. This problem is already a pressing one in the high schools of some of our cities, for these schools are no longer receiving pupils selected almost entirely from the upper 25 percent of the general population. Indeed in some cities the freshman high-school class already has an enrollment 50 percent as large as that of the first elementary grade. Various cities report that practically all elementary-school graduates enter the high school.¹ In short, our high schools are now attended by many pupils with a mental capacity that is only average or even below average. At the same time, many high schools have little to offer these children except a curriculum designed for the highly selected college-preparatory group that attended high school a few decades ago. How miserably this curriculum fails, the elimination figures of most high schools clearly show. The problem of creating a new curriculum for children of average and below-average capacity is one on which intelligence tests give valuable aid.

These are but a few of the administrative uses to which group intelligence-test data may be put. Caution is, of course, necessary. Tests have no greater enemy than the inexperienced and enthusiastic individual who rushes into a program of testing and accepts all test results at their face value.

¹ Of the pupils included in this study, 87 percent entered high school.

THE VALUE OF THE WRITTEN PARAGRAPH SUMMARY

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A cursory glance through many of our leading textbooks on methodology shows that there is a wide difference of opinion among educational experts regarding the value of summarizing or outlining as a method of study. Some writers claim that asking students to summarize, outline, or make a synopsis of their lesson during the study period insures the following: (1) the pupils discriminate in their reading and (2) they organize what they have read.

On the other hand, many authors claim that much time is wasted in the study period by so much indiscriminate note-taking; that pupils are too much addicted to the "pencil and paper" habit; and that time could be more profitably spent by summarizing the lesson in class at the end of the recitation period.

However, since neither group of writers had any scientific evidence to offer, an attempt was made to determine experimentally the value of one form of summarizing as a method of study. The following is a brief synopsis of this experiment.

PROBLEM

Briefly stated the problem is: What is the relative value of a written paragraph summary of an article compared with the re-reading of the same article for the same length of time.

METHOD OF EXPERIMENTATION

Selection of material.—Since this experiment was to be conducted in grades VI, VII, and VIII of the public schools it was necessary to select material that was neither too difficult for grade VI nor too easy for grade VIII. After considerable preliminary experimenting in the University Elementary School and the Junior High School of the State University of Iowa, the four following selections were chosen: (1) an article on the "Sweating System" adapted from Towne's *Social Problems*; (2) an article on "Immigration" adapted from Beard and Bagley's *American History*; (3) an article on "What We Should Know About Tuberculosis"

adapted from a bulletin issued by the New York State Department of Health; and (4) an article on the "Raising of Peanuts" adapted from the *Farmers' Bulletin*, No. 431, issued by the United States Department of Agriculture. These articles varied in length from seven to nine pages and were particularly suited to this type of problem in that they were all highly factual and logically organized.

Division of the class.—In order to measure the relative value of the written paragraph summary as compared with re-reading, it was necessary to divide the pupils into two groups of as nearly equal comprehension ability in silent reading as possible. It was desirable that the device for the division of the class should be like the device for measuring the comprehension of the pupils in the later tests. Hence it was thought that a division based on the ability of the pupils to read and comprehend one of the four articles previously mentioned would be as reliable a method as any. The article on the sweating system was selected as being best suited for this purpose, since very few of the pupils in these grades had ever read anything on that subject and many of them did not know what the title meant. The pupils were asked to read the article through twice and then were given a rigorous test consisting of questions of major and minor importance covering the entire selection. The scores made on this test formed the basis for the division of the pupils into the two groups.

Further to validate and justify this method of dividing the class into two groups the four articles named above were given to a group of twenty students under similar conditions. The instructions for the four tests were identical, the pupils being asked to read the article twice and then take the test. Table I shows the ranks of the pupils on the four different tests.

According to the Spearman footrule method of computation, the correlations are as follows:

Sweating System and Peanuts	0.42
Sweating System and Immigration	0.70
Sweating System and Tuberculosis	0.69

By using the table in Rugg's *Statistical Methods Applied to Education* to transfer these Spearman correlations into Pearson correlations, the following results are obtained:

Sweating System and Peanuts	0.64
Sweating System and Immigration	0.90
Sweating System and Tuberculosis	0.89

TABLE I. SHOWING THE RANKS OF THE TWENTY PUPILS ON THE FOUR TYPES OF READING MATERIAL

SWEATING SYSTEM	PEANUTS	IMMIGRATION	TUBERCULOSIS	
1	5	2	2	Q ₁
2	13	5	5	
3	1	3	1	
4	3	1	4	
5	6	6	3	
6	2	7	8	Q ₁
7	16	4	9	
8	4	10	7	
9	14	14	12	
10	10	9	14	
11	11	11	10	
12	15	15	17	
13	9	8	11	
14	8	13	13	
15	7	19	15	
16	18	12	6	Q ₁
17	20	16	16	
18	19	18	18	
19	12	17	20	
20	17	20	19	

Read table thus: The pupil who ranked 1 in the test on the sweating system ranked 5 on peanuts, 2 on immigration and 2 on tuberculosis, etc.

These correlations, while not perfect, are high enough to indicate that in this group of pupils, ability to comprehend one article is closely correlated with ability to comprehend the other articles. However, the relationship can better be seen by comparing the quartile distributions for the four selections. While the same student does not maintain exactly the same rank in all four tests, yet it may be observed that there is very little change in the quartile distribution. Those students who are in the upper quartile for the first test are almost without exception to be found in the same quartile for the remaining three tests.

Method.—This experiment was conducted in grades VI, VII, and VIII in three representative public schools of cities in Iowa. The number of cases reported is 900. The Summarizing Group was called Group A, and the Re-reading Group was called Group B.

Both sections worked at the same time but in different rooms. Each spent thirty minutes in studying the material and at the end of that time each was subjected to the same rigid test of questions covering the content of the article. The tests were all graded by the writer and a graduate student who had worked through the experiment and who knew it thoroughly. The experimenters alternated the groups, one conducting the experiment in Group A one day and in Group B the next day, in an attempt to offset the effect of personality.

TABLE II. A COMPARISON OF THE TOTAL SCORES MADE BY THE SUMMARIZING GROUP (A) AND THE RE-READING GROUP (B) OF GRADES VI, VII AND VIII ON THE READING MATERIAL, PEANUTS

GRADES AND GROUPS	WHOLE TEST	FIRST HALF	REASON QUESTIONS	MINOR QUESTIONS
VI				
Group A	539	339	135	73
Group B	561	327	113	75
<i>Group B excels by 4.1 %</i>				
VII				
Group A	600	335	144	98
Group B	624	339	161	88
<i>Group B excels by 4 %</i>				
VIII				
Group A	752	407	243	85
Group B	799	462	230	94
<i>Group B excels by 6.2%</i>				

Read table thus: In grade VI, the aggregate score for Group A was 539 on the whole test, 339 when only the first half was considered, 135 on the reason questions, and 73 on the minor questions, etc.

In order that the pupils in the Summarizing Group (A) would understand exactly what was meant by summarizing, ten minutes were spent in class in summarizing two short paragraphs. The experimenter indicated the main points and emphasized the importance of speed and brevity. Then the pupils were given the article and instructions for the experiment. The pupils in

Group A were asked to read the article through *once*, rapidly and carefully. Then on the summarizing form provided, they wrote the main points or ideas of each paragraph. Thirty minutes were allowed for the reading and summarizing and at the end of that time the pupils were submitted to a rigorous fifteen-minute test.

The pupils in the Re-reading Group (B) were simply asked to read the article given them as many times as possible in the thirty-minute period. The same test was given them at the end of that time as was given to the pupils in Group A.

RESULTS

A careful analysis was made of the written work of the pupils in Group A and it was found that in many cases the summaries were not completed in the time allotted. Especially was this

TABLE III. A COMPARISON OF THE TOTAL SCORES MADE BY THE SUMMARIZING GROUP (A) AND THE RE-READING GROUP (B) OF GRADES VI, VII, AND VIII, ON THE READING MATERIAL, IMMIGRATION

GRADES AND GROUPS	WHOLE TEST	FIRST HALF	MAIN QUESTIONS	MINOR QUESTIONS
VI				
Group A	371	300	25	35
Group B	379	284	31	29
<i>Group B excels by 2.1%</i>				
VII				
Group A	457	330	66	24
Group B	506	350	72	26
<i>Group B excels by 10.7%</i>				
VIII				
Group A	780	485	190	49
Group B	932	614	209	66
<i>Group B excels by 19.5%</i>				

Read table thus: Group A of grade vi made an aggregate score of 371 points when the whole test was considered, 300 points when only the first half was considered, 25 points when only the main questions were counted, and 35 points when only the minor questions were counted, etc.

TABLE IV. A COMPARISON OF THE TOTAL SCORES MADE BY THE SUMMARIZING GROUP (A) AND THE RE-READING GROUP (B) OF GRADES VI, VII, AND VIII ON THE READING MATERIAL, TUBERCULOSIS

GRADES AND GROUPS	WHOLE TEST	MAIN QUESTIONS	MINOR QUESTIONS
VI			
Group A	597	227	60
Group B	597	234	52
<i>Group A and B are equal</i>			
VII			
Group A	622	241	61
Group B	649	261	43
<i>Group B excels by 4.3%</i>			
VIII			
Group A	890	350	81
Group B	947	378	82
<i>Group B excels by 6.4%</i>			

Read table thus: Group A of grade vi made an aggregate score of 597 points when the entire test was considered, 227 points when only the main questions were considered, and 60 points when only the minor questions were considered, etc.

true in grades vi and vii. Therefore, because all completely summarized the first half of the material, a comparison was made of the scores of the two groups over the first half of the tests. It must be remembered, however, that such a comparison gives an advantage to Group A since many of the pupils in it spent the major portion of the thirty minutes on the first part of the article.

Again, some of the questions called for considerable thought and organization and consisted of four or five parts, while others were pure memory questions. An analysis was made of the answers of both groups to these two types of questions to see whether those who summarized answered more of the reason and main questions than those who re-read the article, or more of the memory questions.

The results for the two groups on the three types of reading material are summarized in Tables II, III, and IV.

THE DELAYED RECALL

It was thought that probably the pupils in the group which summarized would retain what they had read better than those

in the group which merely re-read the articles. To see whether or not this was so, the same test as was given in the first place was given to both groups at the end of an eight-week period. The results are summarized in the following tables.

TABLE V. A COMPARISON OF TOTAL SCORES OF THE SUMMARIZING GROUP (A) AND THE RE-READING GROUP (B) OF GRADES VI, VII, AND VIII ON MATERIAL, PEANUTS

GROUP	GRADE VI	GRADE VII	GRADE VIII
A	201	216	373
B	212	218	390

Read table thus: Group A in grade VI made an aggregate score of 201 points on the test on peanuts, grade VII, an aggregate of 216 points, etc.

TABLE VI. A COMPARISON OF TOTAL SCORES OF THE SUMMARIZING GROUP (A) AND THE RE-READING GROUP (B) OF GRADES VI, VII, AND VIII ON MATERIAL, IMMIGRATION

GROUP	GRADE VI	GRADE VII	GRADE VIII
A	92	148	354
B	105	139	382

Read table thus: Group A in grade VI made an aggregate score of 92 points on the test on Immigration, Group A in grade VII, an aggregate of 148 points, etc.

A careful comparison of the scores of Groups A and B as presented in Tables V and VI shows that Group B excels in five cases. Group A in grade VII excels on the tests on Immigration.

CONCLUSIONS

1. The data presented in the preceding tables would seem to indicate:

a. That the re-reading of an article is a more economical method of study than the written paragraph summary, when each group studies the same amount of time.

b. The above conclusion is further substantiated by the fact that the Re-reading Group almost invariably made higher scores on the immediate recall test than the Summarizing Group whether the results were compared over the entire test, the first half of the test, over those questions called "reason" and "main" questions, or over those styled "minor" questions.

2. A careful examination of the pupils' summaries showed:
 - a. That verbosity in expressing the main points characterized much of the work of grades VI and VII, and hence much time was wasted.
 - b. That much time was wasted in grades VI and VII because of the inability of the pupils to differentiate between essential and non-essential points.
3. The Re-reading Group in grade VIII made higher scores in every case than the Summarizing Group even though the summaries of the pupils in the Summarizing Group were invariably completed and of an excellent quality.
4. Group A in grade VIII could easily have excelled had the pupils been able to recall at the time of the test the main points found on their summarizing forms. Hence it would seem that the Summarizing Group was handicapped by the method of summarizing each paragraph since the pupils seemed to have a large number of isolated facts but failed to see the relationship and grasp the article in its entirety.
5. Time would be very profitably spent in emphasizing comprehension in the reading of all school material. This statement is verified by an analysis of the papers of the pupils. While the students read the articles on an average of three or four times, yet the median score was less than one-third of the possible score.
6. The data presented in Tables V and VI showing the results of the delayed recall tests would seem to indicate:
 - a. That since all retained only a comparatively small number of the ideas in the original material, frequent reviews would be advisable as a part of the school routine.
 - b. That the written paragraph summary does not seem to be as efficient a method as the re-reading of an article.
7. Observation of the Re-reading Group at work showed that after the pupils had read the article a couple of times, they apparently lost interest in it. It is probable that the pupils of this group could have read a longer article—one which would have held their interest during the entire period—just as profitably in the same length of time.

AGE AND GRADE NORMS FOR THE NATIONAL INTELLIGENCE TESTS, SCALES A AND B

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In June, 1920, the National Intelligence Tests, Scales A and B, Form 1, were given to all the pupils between the ages of eight and fifteen inclusive, who were present on certain days in the public schools of Vallejo, California. They were given by Dr. Terman, Superintendent A. C. Barker, and four members of the school force who had had experience in giving group tests. The scoring and tabulating were done by university students and high-school seniors who were paid for their time. Their work was carefully supervised by Miss Whitmire, but sufficient funds were not available to have the papers scored twice. All computations were carefully checked.

In all cases Scale A was given before Scale B. In about half the classes of grades V to VIII both scales were given at a single sitting, broken only by a rest of five to ten minutes. This was recognized as undesirable but was unavoidable because the tests were made during the last week of the school year. In the other classes Scale B followed one day after Scale A.

Giving both scales at a single sitting does not, of course, affect the norms thus secured for the scale given first (Scale A), nor do we believe that it affected appreciably the norms for Scale B. It could only do so by making the norms too high (effect of practice) or too low (the effect of fatigue). In this case, since the tests of Scale B differ in kind considerably from those of Scale A, fatigue effects would ordinarily be expected to outweigh the practice effects. Whether they did so to any considerable extent can be answered by comparing for each grade and each age separately the ratio of the Scale B norm to the Scale A norm in our own data with the corresponding ratios secured at Washington and Pittsburgh, where in all cases Scale B followed Scale A by one day. These ratios are shown in Tables I and II. It will be seen that on the

¹ The "Age and Grade Standards (Norms)" as printed in the Manual of Directions accompanying the National Intelligence Tests were "based upon approximately 2,000 examinations made in Washington, D. C., and 2,000 made in Pittsburgh, Pennsylvania."

whole the ratios for the various ages (Table I) differ but little from those of Washington and Pittsburgh,¹ and that in those ages where the two eastern cities differ most from each other, Vallejo occupies an intermediate position. The ratio differences by grade (Table II) are more irregular and comparison is rendered difficult by the fact that the Washington norms are given by half grades. However, there is little if any evidence that our norms have been affected by the fact that both scales were sometimes given at the same sitting.

TABLE I. RATIO OF SCALE B SCORES TO SCALE A SCORES,
BY AGES^[a]

Age	Washington	Pittsburgh	Vallejo
8	106.16	94.32	102.9
9	102.74	95.61	101.2
10	103.66	97.92	101.3
11	100.00	99.08	100.7
12	98.23	100.00	98.2
13	100.00	100.78	101.1
14	95.45	100.00	100.5
15	97.54	98.38	97.7

[a] Ratios are multiplied by 100. Those greater than 100 indicate that the Scale B score was higher than the Scale A score; those less than 100 indicate the reverse.

TABLE II. RATIO OF SCALE B SCORES TO SCALE A SCORES,
BY GRADES^[a]

Grade	Washington	Pittsburgh	Vallejo
IIIA	..... }	.....	94.7
IIIB	110.34 }	.....	.....
IVA	104.76 }	96.48	103.5
IVB	105.06 }		
VA	129.85 }	96.85	101.5
VB	101.03 }		
VIA	100.00 }	100.00	99.4
VIB	99.14 }		
VIIA	100.85 }	97.64	96.2
VIIIB	98.47 }		
VIIIA	97.10 }	100.71	98.9
VIIIB	96.48 }		

[a] Ratios are multiplied by 100. Those greater than 100 indicate that the Scale B score was higher than the Scale A score; those less than 100 indicate the reverse.

Inasmuch as the primary purpose in giving the tests was to secure data for tentative age norms, effort was made to test every pupil who had reached the eighth birthday and had not yet become sixteen. In order to accomplish this all the pupils in grades III to VIII were tested. Tests were then given to all pupils in the high school who had not reached the age of sixteen, and to all pupils in the first two grades who were eight years old or older.

According to the state compulsory school law in force at the time the tests were given, every pupil in the state who had reached the age of eight years and who was not yet sixteen should have been in school. Reference to Table III, however, will show that some selection has taken place by the age of fourteen, and that by the age of fifteen it is considerable. To what extent this is due to partial failure of the compulsory school law and to what extent it is due to the attendance of pupils in private and parochial schools, it is impossible to say; nor do we know the nature of the selection that has taken place. However, our norms for ages eight to fourteen inclusive are probably fairly satisfactory for the city in question. Those for years eight and nine are certainly far more valid than those published in the Manual of Directions for Pittsburgh and Washington, as the latter included no tests below the upper half of the third grade. Children of these ages who are in the upper half of the third grade are probably bright children. Accordingly, the Washington and Pittsburgh scores for eight- and nine-year-old children are too high. On the other hand, for ages above fourteen the Pittsburgh and Washington norms are quite worthless, since no tests were made above the eighth grade. Thus the brighter children were left out and the norms for these ages are too low. Even the norms for fourteen from those cities are of questionable value, for in the case of Washington the number of pupils at this age is only 60 percent and in Pittsburgh only 56 percent of the average number for the three previous years. The corresponding figure for Vallejo is 79 percent. Even year fifteen in Vallejo shows a retention of 67 percent as compared with the average for the ages 11, 12, and 13.

As regards social and economic status Vallejo is probably not far from the average of California cities of similar population, though it should be remembered that the general average for California is high as compared with the majority of other states. The only important industries of the city are United States navy

TABLE III. NUMBER OF CASES INCLUDED IN AGE AND GRADE AVERAGES

Grade	Washington	Pittsburgh	Vallejo	Age	Washington	Pittsburgh	Vallejo
III	159	.....	175	8	84	14	171
IV	308	211	210	9	177	96	200
V	291	221	228	10	237	189	172
VI	316	233	142	11	276	213	185
VII	264	182	183	12	280	169	184
VIII	209	196	135	13	252	182	159
IX	.....	.....	102	14	164	105	144
X	.....	.....	38	15	52	41	119
Total	1,547	1,043	1,213	Total	1,522	1,009	1,334

yard activities (largely shipbuilding) and flour milling. These industries have given the city a large proportion of semi-skilled and skilled labor, chiefly of American stock. There is no reason to believe that the proportion either of unskilled laborers or of the professional and semi-professional classes is abnormally large.

The following figures show the nationality classification of the 18.65 percent of school children whose parents were both foreign born:

EXTRACTION	PERCENT
Latin.....	6.71
Teutonic.....	4.73
Scandinavian.....	3.57
Slavic.....	2.26
Miscellaneous.....	1.38

Total 18.65

Children of foreign-born parents were included in the calculation of norms, as nearly all such children were born in the United States.

Tables IV and V make possible a comparison of the age and grade norms of Scale A, Scale B, and total of A and B for the three cities. In all cases these norms are based on averages. For the convenience of those who prefer to use medians the age and grade

medians for Vallejo are given in Table VIII. In Table IV it will be observed that our average total scores for grades iv, v, and vi correspond very closely to those from Washington, but that grades vii and viii are each about 12 points lower than the corresponding grades in Washington. A difference of 12 points corresponds roughly to about 0.4 of a grade, the average difference from grade to grade being approximately 30 points.

It should be noted that the tests on which the grade averages were based were, in all three cities, made near the close of the school year.

TABLE IV. GRADE AVERAGES FOR WASHINGTON, PITTSBURGH, AND VALLEJO

GRADE	WASHINGTON			PITTSBURGH			VALLEJO		
	Scale A	Scale B	Total	Scale A	Scale B	Total	Scale A	Scale B	Total
IIIA	.....	.....	.....	.....	.....	.....	51.2	48.5	100
IIIB	58	64	122	.....	.....	.....	.....	.....	.....
IVA	63	66	129	85	82	167	71.9	74.4	146
IVB	79	83	162						
VA	67	87	174	95	92	187	89.4	90.7	180
VB	97	98	195						
VIA	104	104	208	112	112	224	107.9	107.2	215
VIB	116	115	231						
VIIA	118	119	237	127	124	251	120.8	116.0	237
VIIIB	131	129	260						
VIIIA	138	134	272	140	141	281	132.7	131.3	264
VIIIB	142	137	279						

No comparison of age averages need be made except for the years 10 to 13, as the Washington and Pittsburgh norms are misleading and worthless below 10 and above 13. For the years 10 to 13 the Vallejo norms are below those of Washington by 15, 16, 11, and 4 points, respectively, and for the same four years they are below those of Pittsburgh by 38, 35, 13, and 23 points. That is, the Vallejo norms for these four ages average nearly a year below those of Pittsburgh.

TABLE V. AGE AVERAGES FOR WASHINGTON, PITTSBURGH, AND VALLEJO

AGE	WASHINGTON			PITTSBURGH			VALLEJO		
	Scale A	Scale B	Total	Scale A	Scale B	Total	Scale A	Scale B	Total
8	65	69	134	88	83	171	34.6	35.6	70
9	73	75	148	91	87	178	57.1	57.8	115
10	82	85	167	96	94	190	75.7	76.7	152
11	98	98	196	108	107	215	89.6	90.2	180
12	113	111	224	113	113	226	107.4	105.5	213
13	119	119	238	128	129	257	116.3	117.6	234
14	132	126	258	130	130	260	133.3	133.9	267
15	122	119	241	123	121	244	137.0	133.8	271

TABLE VI. GRADE INCREMENTS IN TOTAL SCORES OF SCALES A AND B

Grades	Washington	Pittsburgh	Vallejo
IV to V	36	20	34
V to VI	36	37	35
VI to VII	29	27	22
VII to VIII	17	30	27
Average	29	28.5	29.5

TABLE VII. AGE INCREMENTS IN TOTAL SCORES OF SCALES A AND B

Ages	Washington	Pittsburgh	Vallejo
8 to 9	+14	+ 8	+45
9 to 10	+19	+12	+37
10 to 11	+29	+25	+28
11 to 12	+28	+11	+33
12 to 13	+14	+31	+21
13 to 14	+20	+ 3	+33
14 to 15	-17	-16	+ 4
Average for 9 to 14	22	16.65	30.65

Tables VI and VII show the age and grade increments in total score of Scales A and B in the three cities. Since the Washington norms are given by half grades, the grade increments for that city are based upon the averages for the upper half of each grade.

The grade increments for all three cities suggest that a year of growth ought to yield an increment of about 29 points. However, when we examine the age increments of Table VII we find that only those of Vallejo give results which agree with this assumption. Washington and Pittsburgh show increments at most ages which are considerably less than this. In both of these cities the increments are small in the lower years, increase gradually until toward the middle of the age range they approximate the expected increments, then decrease in the higher ages until finally the increment becomes really a decrement corresponding to about a half year of mental age. This is, of course, due to selection. It is evident that at Washington and Pittsburgh only the brighter children below ten years were tested. On the other hand, at Washington only the duller children above twelve and at Pittsburgh only the duller children above thirteen were tested. At Vallejo, however, the annual increments from ages nine to fourteen approximate those which would be expected according to the grade results. Here the low increment from fourteen to fifteen is probably due in the main to the selection which has operated with our fifteen-year-olds. The unexpectedly large increment at Vallejo from eight to nine is probably due to the fact that many eight-year-olds are not adequately measured by the scale, perhaps because of its literacy requirements. This would tend to reduce the average for year eight considerably below where it ought to be, and is an error which the median tends to exaggerate even more than does the average. At any rate our comparison of the age and grade increments suggests that our age norms for the years nine to fourteen are probably not far wrong for the city in question, and that those of Washington and Pittsburgh are probably of little value except in the very middle of the age range.

The author of the Manual of Directions has made a set of provisional age norms in which an effort has been made to allow for the factor of selection in the upper and lower ages. The method of making these corrections is not stated, but the corrections themselves are shown in the third column of Table VIII. In the fourth and fifth columns of the same table are shown the age

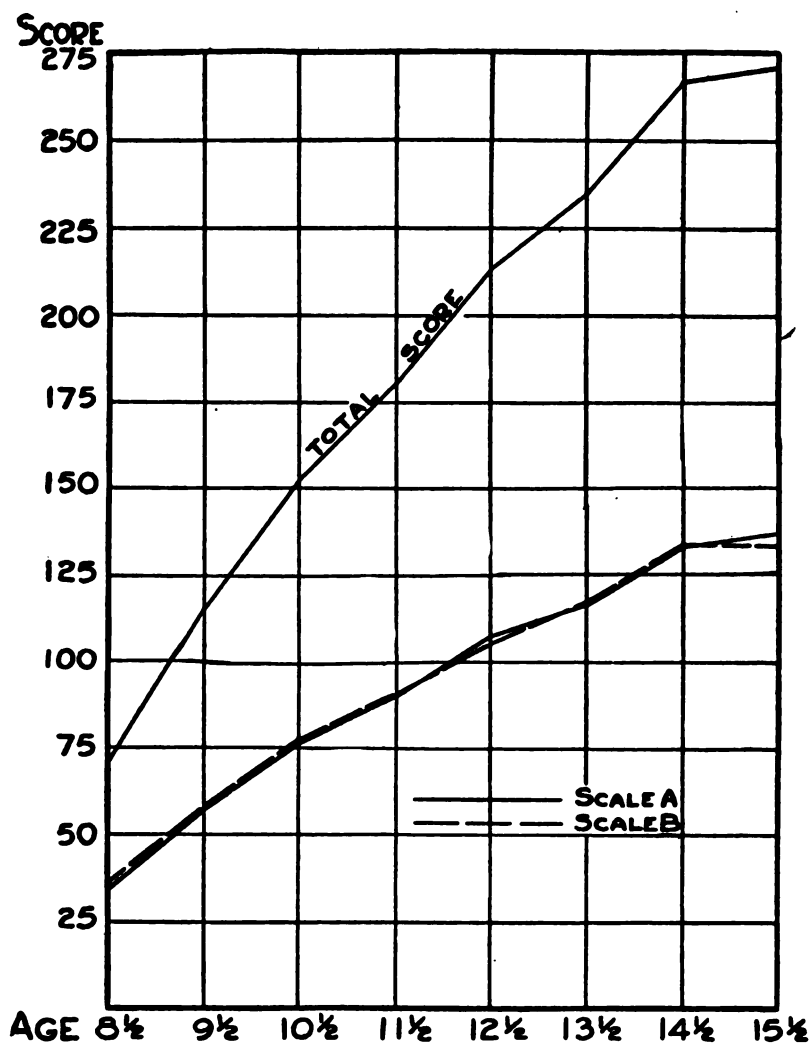


FIGURE 1 Scale A, Scale B, and Total of A and B by age. Children from 8 to 9 are classed as 8½ etc.

averages and age medians for Vallejo. Until extensive data are available on a more nearly unselected group, we believe that the age norms given in columns 4 and 5 should be used in preference to the figures in the third column, which are the tentative norms recommended in the Manual of Directions.

TABLE VIII. AGE NORMS FOR TOTAL SCORE OF SCALES A AND B

Age ^(a)	Washington Average	Pittsburgh Average	Norms Recom- mended in Manual	Vallejo Average	Vallejo Median	Average for Scale A Alone
	1	2	3	4	5	6
8.5	134	171	130	70	60	35
9.5	148	178	155	115	118	57
10.5	167	190	180	152	158	76
11.5	196	215	205	180	186	90
12.5	224	226	225	213	216	107
13.5	238	257	245	234	243	116
14.5	258	260	260	267	268	133
15.5	241	244	275	271	274	137

[a] In all cases age 8 includes children from 8 to 9, age 9 those from 9 to 10, etc. Accordingly, the age standards given are always those for ages 8.5, 9.5, etc. This more correct notation has been used in Table VIII and Figure 1.

The age medians for Scale A and Scale B are very nearly equal at all ages when Scale A is given first. If a pupil has taken only Scale A, and it is desired to estimate what his probable total score would have been had he taken both scales, it is only necessary to multiply the score on Scale A by 2. While this rule is not absolutely accurate, it is sufficiently so for all practical purposes. The correlation between Scale A and Scale B was computed and found to be 0.928, Pearson.

Figure 1 shows graphically the Vallejo age curves for Scale A and Scale B. These curves are based upon averages. Within the range of validity (probably 9 to 14 years) the curve of each scale approximates a straight line. If it were not for the reduced validity of the test below 9 years and the unfavorable selection of cases above 14, it is probable that the line would be approximately straight from 8 to 15.

THE VALUE OF A HANDWRITING SCALE TO AN UN- TRAINED TEACHER

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Various investigators have shown that the use of either the Ayres or Thorndike handwriting scale will materially reduce the variation among judges in marks assigned to the same specimens, and will also reduce the variation between successive markings made by the same individual. This fact of reduced variability would imply increased accuracy. A few teachers, however, are consistent in their ratings of handwriting but grossly inaccurate—that is, they consistently mark 10, 15, or 20 percent above or below the true value. This consistent inaccuracy would not be particularly serious if it existed to the same degree and in the same direction among all teachers, or even among all teachers in the same grade in the same school system. This, however, is not the case.

The writer has, during the past two years, gathered data bearing on this question: Will the use of a handwriting scale, among those who have never used it before, result in more accurate grading of handwriting? In the school years 1918–1919 and 1919–1920, students in the writer's classes in educational measurements worked out an experiment which is an adaptation of that suggested by Thorndike in the *Teachers College Record* for November, 1914.

Students first rated Thorndike's fifty specimens (whose true values are known) by the usual percentage method. They were told simply to rate these specimens as they would, or did, rate handwriting in their schools; except for the fact that they were not to think of the writing as belonging to any particular grade but were to think of 100 percent handwriting as that which is perfect and 0 percent handwriting as that which is worthless, or possessed of no beauty or legibility. The students were then supplied with copies of the scale. For over 90 percent of them it was the first time that they had ever seen a scale, while only four or five of the entire number had ever actually *used* a scale before. A brief explanation of the scale and its uses was given by the instructor and the students proceeded to rate the fifty specimens

again, this time in terms of scale units. These grades were set down in appropriate columns of a table which each student constructed, and the instructor then supplied the correct values of the fifty specimens as given by Thorndike, which were also recorded.

Scale ratings were then converted into percents by multiplying by 5.5 in the case of the Thorndike scale, and in the case of the Ayres scale by first adding 20 to the scale values and then multiplying by 0.825. The deviation of each score from the correct score was then computed; these deviations were added; and the sum was divided by 50. The resultant quotient represented each individual's average error in scoring the same specimens with and without the scale. To facilitate computation, average errors were expressed to the nearest integer.

During the year 1918-1919, 176 students performed this experiment using the Thorndike scale; and during 1919-1920, 102 students did so using the "Gettysburg Edition" of the Ayres scale. As will be described later 44 others performed the experiment under somewhat altered conditions. All these 322 were students in the writer's classes in educational measurements conducted in sixteen cities and towns in southeastern Ohio in connection with the work of the Extension Department at Ohio University. Most of them were teachers in active service in the grades. A few were high-school teachers, principals, and superintendents. A total of 31,100 ratings were used.

Table I shows the distribution of the average errors of 278 of these teachers in both directions. Table I is to be read as follows: One teacher made an average error of 7 percent without the scale and 4 percent with it, one an average error of 8 percent without a scale and 4 percent with it, three an average error of 9 percent without a scale and 4 percent with it, and so forth. It will be seen that the median of average errors without a scale is 11.8 percent and with a scale the median is reduced to 6.8 percent. In other words, the mere use of a scale among these 278 teachers, who were almost entirely unacquainted with a scale and its use, reduced the average error 5 percent. Thus, 42.4 percent of the error was eliminated when the scale was first brought into use. Note that the lowest average error without a scale was 6 percent. Eight people, or 2.9 percent of the entire group, graded with this degree of accuracy by ordinary methods. On the other hand, 121, or 43.5 percent,

showed this or a greater degree of accuracy when a scale was supplied; and this was in spite of the fact that the scale was to them a new tool, to the use of which they were not accustomed.

TABLE I. DISTRIBUTION OF THE AVERAGE ERRORS (IN PERCENTS) OF 278 TEACHERS WITH AND WITHOUT A SCALE

Average Error		Without a Scale																		Total
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Over 20			
With a Scale	4		1	1	3						1		1					7		
	5	4	2	3	6	5	3	4	1	4	3	1		2	1			39		
	6	3	4	8	11	6	5	7	5	5	7	5	1	3		2	3	75		
	7	1	3	8	9	4	4	6	7	1	7	2	3	1	2	1	4	63		
	8		1	3	7	5	4	4	2	4	3	3	1		2	2	1	42		
	9				1	2	1	3	3	2	1	2	1	1		1	2	20		
	10		1	3	2	1	1	3	1		2							14		
	11					2		2	1		2		1		1		2	11		
	12					1		1				1						3		
	13															1		1		
14			1						1	1							3			
Total		8	12	27	39	26	18	30	21	17	26	14	8	7	6	7	12	278		

Median error without scale, 11.8 percent

Median error with scale, 6.8 percent

Of the 278 teachers, 13 or 4.7 percent showed a loss in accuracy when using a scale for the first time; 13 or 4.7 percent showed no change; and 252 or 90.6 percent showed an improvement, ranging from 1 percent to 28 percent. This condition is more clearly stated in Table II.

TABLE II. GAINS IN ACCURACY

Gain (Percent)	Frequency	Gain (Percent)	Frequency
-6	1	8	18
-5	0	9	15
-4	0	10	12
-3	1	11	7
-2	4	12	7
-1	7	13	6
0	13	14	3
1	28	15	3
2	29	16	3
3	27	17	0
4	27	18	1
5	25	19	1
6	23	28	1
7	16		
		Total	278

Our data furnish some evidence on the much discussed question as to which of the two scales is the more valuable. The 44 teachers (all in one city) referred to in a preceding paragraph scored only 25 of the 50 specimens but scored these first in the percentage fashion, then by the Thorndike scale, and finally by the Ayres scale. The brief period of practice with the Thorndike scale may have resulted in increased skill in scale use and hence have given the teachers some advantage in using the Ayres scale. On the other hand, since the work was all done at one sitting, fatigue probably offset this advantage. At any rate, the median of the 44 average errors with the Thorndike scale was found to be 6.4 percent and with the Ayres scale, 6.3 percent. These scores are not included in the tables.

As stated above, 176 of the 278 teachers listed in Table I used the Thorndike scale and 102 used the Ayres scale, "Gettysburg Edition." The median of the average errors made by the first group without a scale was 11.9 percent and with a scale 6.5 percent. For the second group the corresponding figures were 11.7 percent and 7.3 percent. These figures seem to indicate that untrained teachers can do slightly more accurate work with the scale devised by Thorndike.

Does experience in teaching make for increased accuracy in handwriting grading either with or without a scale? To answer this question I correlated the average errors without a scale of the 176 students in the 1918-1919 group with the number of years of teaching experience, using the Pearson formula. I found the value of r to be 0.0009. Teaching experience neither increased nor decreased on the average, the accuracy of handwriting grading without a scale, i. e., in the percentage manner.

To measure the effect of experience upon ability to use a scale without practice, experience in years was correlated with average errors with a scale. A positive coefficient of 0.24 was found. The reader should bear in mind that a positive coefficient here means that, so far as this group is typical, the more experience a teacher had, the less profitably she used a handwriting scale without practice. In other words, the evidence is that teaching experience does not increase the average individual's accuracy in grading handwriting by the ordinary percentage method under the conditions involved in the experiment, and that it actually decreases his ability to use a scale.

Editorials

THE SCHOOL AS A SELECTIVE AGENCY

Average mentality expressed in the form of an intelligence quotient is 100. There is evidence to show that the typical first-year high-school pupil has a mentality of 105 and that, three or four years later, high-school graduates show a record of 111. Between graduation from high school and entrance to college there is further evidence that mentality moves up something like four notches to 115. If the same process continues in college, the median intelligence quotient of college graduates will be found to be 120 or over.

The school has not engendered this ability. Those who evince a given degree of mentality have it as a possession as inherently as they have blue eyes or Roman noses. Unconsciously the school, year after year, sifts through meshes of larger and larger size those who are relatively less capable, and retains those whose endowments mark them for intellectual success.

As an institution devoted to preparing the young for more complete living, the school has always been so much an instrument of selection that it is a question whether those who receive its benefits are as much *developed* as they are *certified* for the affairs of life. The school not only trains children and young people but also attests their success as students. Its official record is accepted as evidence of competence. If those who have attended school a relatively long time have greater earning capacities than those who have attended a shorter time, if social standing is powerfully influenced by educational advantages, if appointment officials and civil service commissions give much weight to diplomas and degrees, and if in general we proceed on the assumption that each higher round of the educational ladder confers upon those who reach it additional fitness for life, it is because those who have more schooling are not only better trained but also more highly selected.

The notion that the school produces its results through training alone is too naïve to be entertained. It is true that we sometimes hear teachers and other school officers speak as if the suc-

cess of their pupils in after life were wholly attributable to instruction. Those who have sought to measure the results of teaching have often been told to look for them ten, twenty, or thirty years later. The fact is that our students have certain endowments long before they come under our influence. We may help them to realize their possibilities, or we may hinder them in their development; but we cannot create capacity.

Within the past few years the means have multiplied by which the school has become consciously the directive and selective agency which it has always been unconsciously. Our educational and intelligence tests permit us to ascertain the capacities of pupils far more accurately than ever before. Thus, the teacher becomes a guide and director. He is still the trainer of youth but he selects one to be trained in this way and another in that. He is no longer blind. He sees the limitations and the failures of his pupils and he applies his remedies—that is, he brings training into play—where it will do the most good.

Some will say that these conceptions are fatalistic and depressing, but the real question is not a question of fatalism but of truth. As to the teacher, it seems to us that his calling is likely to take on added importance because of the new opportunities which these conceptions will bring him. Instead of prescribing the same treatment for all, he will become the expert diagnostician. On the basis of mental ability he will reclassify children, and because of their special abilities, he will further subdivide them. Promotion will be for those who can profit by advancement rather than for those who have reached a predetermined standard. The gifted, the mediocre, and the dull will be detected, not merely for the sake of identifying them, but essentially in order that finer adjustments may be made and larger opportunities realized. When to the old consecration by which the craft has been distinguished is added the new insight which modern methods can confer, teaching will acquire new dignity. The modern school as an institution and the teacher as its official will then be recognized as properly concerned with selecting as well as with training.

B. R. B.

DERIVING AND PUBLISHING EVALUATED MATERIAL

The derivation of tests involves the evaluation of the elements of which the tests are composed. We need a far larger body of

these evaluated elements than now exists. Indeed, there is ground for believing that if all the elements which are now used in the teaching process were evaluated, a much more intelligent use would be made of them. For example, if all the problems in an arithmetic had a difficulty rating, it is clear that fewer misunderstandings between teachers and pupils would arise, that more reasonable assignments would be made, and that a more satisfactory gradation and adaptation of material to the needs of pupils would be possible.

And even if we confine ourselves to the use of test material for measuring purposes, it is perfectly evident that we need a far richer supply of these fundamental data. This is especially apparent when we consider the desirability of refining the existing tests. For example, at the meeting of the education section of the American Association for the Advancement of Science at Chicago on December 30, Dr. Luella W. Pressey presented an analysis of Monroe's Silent Reading Tests. Because of the relatively large number of exercises in the several parts and forms of this instrument, she was able to devise several tests, each made up of material of a similar character—one of science material, another of poetry, etc. She reached certain interesting conclusions as to the limitations of a general reading score based on a test consisting of different sorts of material. It was clear, however, that Dr. Pressey could have carried her investigation much further if she could have had at her command a still richer body of evaluated exercises. It has often been observed that one of the tendencies in the test movement is precisely towards this type of analysis. In virtue of it we shall, no doubt, have in the place of general reading scales, scales for narrative, for exposition, for scientific writing, for poetry, etc. We already have, instead of general scales for composition and handwriting, analytical scales involving the measurement of special abilities.

Not only in the refinement of our instruments and in the analysis of the more general forms of educational measurement, but also in the repetition of tests do we require a greater volume of material. Not infrequently a teacher or a superintendent, after having used all the available forms of a test, desires to continue its use in order to secure progress records. Since the children are already familiar with the existing material, their subsequent scores

will represent not only progress but also the learning effect of the previous presentations. Since the latter is difficult or impossible to measure, the progress record remains undetermined. And yet such a record constitutes an especially valuable result of testing. Probably one of the most serious criticisms of the use which school people are now making of tests is that they do not continue their use long enough to receive the full benefit of them. Yet in justice to the school people, it should be said that a more continuous use of the tests would doubtless be made if they were extended, enriched, and provided with more alternative forms—in other words, if a larger body of evaluated material were available.

Moreover, every research bureau should have at hand a supply of standardized words, problems, questions, and other items which it can utilize in new combinations and for special purposes. Indeed, it seems to us to be one of the routine duties of such a bureau annually or semiannually to gather the responses of a large number of children to a variety of test elements. Such material in the files of the bureaus should be as much a part of their standard equipment as typewriters or adding machines.

We shall not attempt to be exhaustive in pointing out the uses that may be made of scaled data. Our purpose is served if we establish the fact that these uses are many and important. The lack of such material is evident on every hand. Questions of import cannot be answered without it. The “best” method of teaching a given subject, the value of particular kinds of drill, the amount of time that may be most economically spent on a subject or a phase of a subject, the distribution of this time into long or short periods, the rate at which material should be presented, the influence of types of imagery on methods of learning and of teaching, the effect of re-learning or review and of the intervals between periods of re-learning, the comparative efficiency of a “whole method” and a “part method” of learning, the extent to which there is a transfer from abilities acquired in given situations to abilities manifested in other situations—these and almost countless numbers of problems which beset the paths of both school people and research workers demand for their investigation a rich and highly organized body of calibrated items.

Such being the case, it is proper to inquire how this sort of material can be produced in larger volume. Everyone who has at-

tempted the evaluation of data knows that the process is tedious and expensive—often prohibitively so when sufficient returns are to be handled to secure a relatively high degree of reliability.

But it is quite possible to abridge the usual method of evaluation and to ascertain the difficulty of new material by utilizing material whose difficulty has already been determined. We do not mean that the results obtained in this way will be as accurate as those obtained from a large number of returns on each item, but sufficient accuracy may be secured for most practical purposes. Thus, as money makes money, so evaluated material may be used to make evaluated material.

We have tried this sort of thing in a small way. On a list of fifty words we had returns from between 4,000 and 5,000 children in the fourth, fifth, and sixth grades.

We divided the list into two equal parts, assuming that the first twenty-five words were of known difficulty and the second twenty-five of unknown difficulty. We then investigated the returns from a small city system in which there were about one hundred children in each of the fourth, fifth, and sixth grades. We found that on the first twenty-five words these children did better than our norms led us to expect—better by an amount which we were able to determine. Now, to the extent that the spelling ability of this group of children was general and not merely specific with reference to these words, the same superiority might be expected to be revealed in the second half of the list—i. e., in the undetermined words. Accordingly, the results from this small city on the undetermined words were reduced by the same amount. Up to this point we had been ignoring the fact that we really knew the difficulty of the second half of the list. We now compared the difficulty as obtained from the three hundred children with the difficulty which we had previously found. Only two or three of the words were displaced as much as two columns on the Ayres scale, and most of them were not displaced at all. This result was obtained from about one-fifteenth of the original number of cases and with perhaps one-twentieth of the labor required to set up the first norms.

A purist may be pained at even this amount of divergence. The differences, however, are surprisingly small. In the first place the Ayres scale has a certain unreliability. Indeed, we have reason to believe that this unreliability is greater than has

been supposed. In the second place, our original determinations of difficulty for these fifty words were also unreliable to a certain extent. In the third place, scarcely any of the discrepancies amounted to more than half the average difference in spelling ability between successive grades. We should not recommend the use of evaluations of this sort for the more refined purposes of measurement, but for most practical purposes we believe them to be sufficiently accurate. If such is the case, it lies within the resources of almost any superintendent to evaluate his own material, if he has at hand a small amount of accurately scaled elements.

We believe, therefore, that all who are interested in educational research should be busy in the standardizing of material. Moreover, this material once standardized should not lie in the files of research bureaus nor in the desks of school superintendents. It should be published. Its production ought to be a cooperative enterprise. In order that it may be, publication is indispensable. Moreover, the material must be issued in such a form that others may add to it. Original rather than derived figures are necessary. For example, it is not sufficient to print merely percents correct for words or questions. The number of children participating and the number of correct responses must also be given, so that each of these figures may be augmented by other workers, and to the end that the derived percents may become progressively more reliable. But this sort of publication is expensive. It tends to run to long and very detailed tables. Such tables, however, are to be regarded as source material. Like the population tables and financial statistics of the Federal Census Bureau, they are fundamental to the study of a vast number of questions. Their independent value is not nearly as great as their value when brought into relation with other things.

A reasonable amount of this sort of material should be presented by the periodicals. The JOURNAL OF EDUCATIONAL RESEARCH proposes to do its part.

B. R. B.

Reviews and Abstracts

E. H. CAMERON, *Editor*

GUGLE, MARIE. *Modern junior mathematics*. New York: Gregg Publishing Company, 1920. 3 books.

The junior high school as a part of the 6-3-3 plan of school organization is winning strong approval and support from many quarters. Miss Gugle's attempt to provide this new type of high school with suitable modern texts in mathematics is one of the more successful among several such recent ventures. Book One, planned for the seventh school year, covers rapid correct calculation, checks and short cuts, and everyday business arithmetic with the elements of bookkeeping. Book Two, an eighth-year text, is given up to observational geometry with an introduction to algebra through the formulas arising from certain measurement problems. It contains an appendix on mathematics clubs. Book Three, for the ninth year, develops algebra through simple quadratics in two unknowns; applies sines, cosines, and tangents to problems in heights and distances; and closes with a short introduction to demonstrative geometry.

Some noticeable characteristics of these books are: (1) drill in rapid accurate calculation in everyday business arithmetic motivated through time tests; (2) continued and well-coordinated use of graphic methods; (3) a simplified treatment of percentage; (4) a close correlation between arithmetic and familiar everyday business affairs; (5) a concrete informal and interesting observational study of form and measurement which makes an excellent foundation for later work in formal demonstrative geometry as well as leading to formulas introducing in a natural way the literal notation of algebra; (6) the emphasis of meaning and reasoning in algebra above the too common stress on manipulative skill in complicated and unusual algebraic forms; (7) sufficient economy of time, through simplification in algebra, to introduce in the ninth year logarithms, the elements of trigonometry, and some formal demonstrative geometry; (8) constant aims at greater reality through correlation with the pupils' common life experiences; (9) an organization of subject matter with greater reference to psychological and pedagogical order than to abstract logical order; (10) some attention given to historical setting.

Teachers who are sensitive to suggestions on ways to improve high-school mathematics, even if not teaching in a junior high school, will find these good books well worth examining.

ERNEST B. LYTLE

University of Illinois

GAYLEY, CHARLES M., YOUNG, C. C., AND KURTZ, B. P. *English poetry: its principles and progress*. New York: Macmillan Company, 1920. 728 pp.

This is a revised and enlarged edition of the book bearing the same title which first appeared in 1904. The editors have here added about one hundred and fifty

short poems from later writers, especially from those whose work mirrors the life of the twentieth century both in peace and at war. In their attempts to adapt the book more thoroughly to the needs of the high-school student, the editors have omitted the former introduction, which they called "The Principles of Poetry," and have substituted about fifty pages which they have styled "An Introduction to the Study of Poetry." This new material, which presents in lucid form what every high-school student should know of that subject, has been written by Professor Gayley in his usual attractive and stimulating manner. Both the student and the general reader will enjoy both the introduction and the good poetry that follows.

H. G. PAUL

University of Illinois

SMITH, WAYNE P. AND JEWETT, EDMUND G. *An introduction to the study of science.* New York: Macmillan Company, 1919. 609 pp.

With but few exceptions, this book contains an excellent choice of material. Commendable features are the emphasis upon experimentation and utility. The style and general presentation are not well adapted to high-school freshmen. They are much better suited to seniors. The review questions at the close of the various chapters are too largely of the memoriter type and refer back too directly to the text. Had many of them been omitted and more suggestive questions been included, the book would have been materially improved. The text is recommended for reference rather than for classroom purposes.

LEWIS W. WILLIAMS

University of Illinois

TRAFTON, GILBERT H. *Science of home and community.* New York: Macmillan Company, 1920. 557 pp.

What constitutes the proper field of general science? The author answers this question as follows: "Whether any particular science or any particular topic should form a part of the course depends on the number and value of the elements that it possesses in common with the child's life." His conclusion that from this standpoint physics and hygiene should dominate the text is not supported by any evidence. It is doubtful whether the study of such topics as the wireless telegraph and the airplane can be justified by means of the above criterion.

In general, the author has succeeded in accomplishing the aim he has set for himself. The idea of grouping material around the science of the home and the science of the community seems especially fitting for his purpose. The projects outlined for pupils and the questions suggested for class discussion are well chosen. Teachers of general science when choosing a text should give this work thorough consideration.

LEWIS W. WILLIAMS

University of Illinois

DEWEY, EVELYN, CHILD, EMILY, AND BEARDSLEY, RUMI. *Methods and results of testing school children.* New York: E. P. Dutton and Company, 1920. 170 pp.

This volume is a report of the use of various psychological tests used in the measurement of certain groups of children in New York City. The children were all of

Jewish parentage and were selected in such a way that representative groups were obtained for each of the ages eight to thirteen inclusive. The tests were given to fifty boys and fifty girls of each age.

After some preliminary testing the following group tests were selected.

Picture Completion	Memory for Objects
Healy A	Healy B
Identification of Forms	Memory for Digits
Opposites	Card Sorting
Cancellation	Substitution
Cart Construction	Narrative Pictures
Rossolimo	Instruction Box
Ball and Field	Steadiness
Nail Driving	Learning Box
Needle Threading	Strength
Problem Box	Binet-Yerkes
Knox Cubes	

Exceptional care was exercised in the giving of the tests. The results, therefore, have an unusual significance. A feature of the report is the form in which the test norms are given. For each age the mean and standard deviation, together with their respective probable errors, are given. For most of the tests the norm is also given in the form of the regression equation on age. By means of this equation the standards for any age within the limitation covered by the survey can be immediately obtained. The use of the regression equation assumes a rectilinear relation between the test scores and age. No correlation tables are given by means of which the validity of this assumption can be judged accurately. In some cases the relation of the means to the ages is such as to suggest that the relation is not rectilinear.

The authors attempted to select from the tests used certain ones that would form what they call a "maturity scale." Such a scale does not differ in function from the Binet scale or group intelligence tests. The criterion of selection of individual tests for this scale is chronological age. The tests were chosen which correlated most highly with chronological age. By means of this criterion seven tests were selected to form a "maturity scale" for boys and six tests were selected to form a "maturity scale" for girls. For each of these groups of tests the regression equation is given. A child's score on the maturity scale can be found by substituting his scores on the individual tests in this equation.

In addition to the report on psychological tests brief mention is made of a social and physical study of the same pupils.

The book does not appear to be of major importance. The average school man will find little in it that is helpful. The greater portion is devoted to the reproduction of the tests and to tables and charts. The sample statistical treatment of the data collected may well serve as a model for other reports.

W. S. M.

SMITH, ALICE M. *Short plays by representative authors*. New York: Macmillan Company, 1920. 318 pp.

Twelve plays are here presented, mostly of the one-act variety, selected apparently on the plan of introducing the works of many nationalities. The majority of them are here exploited for the first time in a collection of this kind. Nations represented are

Iceland, Wales, England, India, The United States, Germany, Ireland, Russia, and negro America. The twelve plays run the gamut of type, from the bald realism of the Icelandic play, *The Hraun Farm*, to Stuart Walker's inimitable fancy, *Six Who Pass While the Lentils Boil*. Sentiment is provided in Jeannette Marks' *The Merry, Merry Cuckoo*, in Tagore's *The Post Office*, and in *The Shadowed Star* by Mary Macmillan. Mastery of dramatic technic and superlative dramatic movement are represented by John Masefield's adaptation of an old saga in *The Locked Chest* and in Ludwig Fulda's *By Ourselves*. Pictures of *genre* types are not absent; the most notable are Lady Gregory's *Spreading the News* and Ridgely Torrence's strong picture of the American negro in *The Rider of Dreams*.

In addition to the catholicity of taste displayed in choosing and the variety of types given, all of the plays in the collection are actable, making the book distinctly useful to those who are interested in producing good examples of modern short plays. Since most of the plays will in all probability be new to those who encounter this book, it will prove valuable as an addition to the growing literature of the short play.

C. H. WOOLBERT

University of Illinois

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Walter S. Monroe, University of Illinois, Urbana, Illinois.

Readers of the JOURNAL OF EDUCATIONAL RESEARCH will remember the article by Director Murray A. Dalman of the Indianapolis public schools, in the January 1920 number. In this article Mr. Dalman showed a unique use which he had made of test material. This material consisted of a series of tests in each of the New Edition of principal topics in algebra. For each topic there was an exercise "The Hurdles" appropriate to each of four levels of ability among students. The editors of the JOURNAL OF EDUCATIONAL RESEARCH have frequently been asked how this test material could be obtained. Mr. Dalman writes recently that he is making up a new edition of "The Hurdles." Doubtless those who are interested may obtain copies of them from him at a nominal charge.

We have lately received a copy of the report prepared by Miss Clara Mallory on tests in silent reading (Monroe) and spelling. This material shows not only the achievement in these subjects in 1920, but also a comparison with achievements in 1919. In both years the testing was done in the fall. As usually happens where a continuing policy is in operation, marked improvement is shown. For example, in spelling Miss Mallory notes, "Last year it was not possible to get results from the

third grades, as they were not able to write the words; but this year the third grades in some places are up to standard and some of them are above standard." In connection with the graphs a few paragraphs of interpretation are included in the report and some suggestions to teachers.

On December 16, 17, and 18, the Conference of State and Pariah School Officials was held at New Orleans under the auspices of the State Department of Public Instruction. Considerable attention was given to questions of educational research. Indeed, there was a decided disposition on the part of the makers of the program to give the entire discussion a fact basis. Dr. Walter S. Monroe was the principal speaker from outside the state. He addressed the conference on the following topics: (1) measurement of general intelligence and achievement of school children; (2) standards for achievement tests and their use; (3) objectives in arithmetic; (4) equal educational opportunities; (5) the teaching of arithmetic; (6) royal roads to learning.

The Bureau of Educational Measurements, Kansas State Normal School, Emporia, Kansas, announces for distribution the following new tests: Lunceford Number Test, Kansas Latin Test and Beach Music Test.

The following statement has been received concerning the Commonwealth Fund.

The directors of the Commonwealth Fund having become convinced of the importance of encouraging educational research requested a group of leading educational men of the country to report upon the opportunities in the field and recommend a plan of operation.

This Educational Research Conference was held in Atlantic City on October 23, 24, and 25, 1920. The members attending the conference were: A. Ross Hill, President, University of Missouri, *Chairman*
 Lotus D. Coffman, President, University of Minnesota
 Charles H. Judd, Director, School of Education, University of Chicago
 Paul Monroe, Director, School of Education, Teachers College, Columbia University
 Leonard P. Ayres, Director, Division of Education, Russell Sage Foundation
 Samuel P. Capen, Secretary, American Council on Education
 Paul H. Hanus, Professor of Education, Harvard University
 Max Farrand, General Director of the Commonwealth Fund

A gratifying feature of the conference was that the members were able to agree so readily, not merely upon the large divisions of the field, which were fairly obvious, but also in selecting some of the most desirable problems to be investigated within each division.

The conference therefore made its report, choosing for its main subjects: the problem of school revenues; the evaluation, analysis, measures and standards of accomplishment of school subjects; the field of supervision; and the reorganization of public school systems. In each one of those larger divisions the conference chose a particular subject by way of illustration, suggesting how and by whom the study of that particular subject might be advisedly undertaken.

For the carrying on of this research, the conference recommended the appointment of a committee to consider and recommend projects for research, and to assume executive responsibility for supervising the carrying on of such researches as might be adopted, and it was deemed advisable that this committee might also recommend researches to be undertaken by individuals or associations.

The directors of the Commonwealth Fund accepted this report, and appointed the following committee:

Leonard P. Ayres, Vice-President, Cleveland Trust Company

Samuel P. Capen, Secretary, American Council on Education, *Secretary*

Lotus D. Coffman, President, University of Minnesota

Ellwood P. Cubberley, Professor, Stanford University

Charles H. Judd, Director, School of Education, University of Chicago

Paul Monroe, Director, School of Education, Teachers College, Columbia University

Frank E. Spaulding, Professor, Yale University

Max Farrand, General Director, The Commonwealth Fund, *Chairman ex officio*

Superintendent M. E. Moore of Beaumont, Texas, has recently attempted to answer the following questions by addressing a questionnaire to the
A Study of superintendent of schools in the class of cities indicated.
Supervision

"1. How many visits should a superintendent in a city of from 30,000 to 100,000 population make to each building in the course of the year, without necessarily visiting each room?

"2. How many visits a year should he make to each schoolroom?

"3. How many supervisors should the above named cities possess?

"4. What supervisors?"

Replies were received from forty cities, thirty-three ranging in population from 30,000 to 100,000 and seven ranging from 100,001 to 325,000.

Twenty of the answers to the first question were of the form "as often as possible," "no fixed schedule," "many times," "no rule." The median practice of the remaining twenty cities is from six to nine visits per year to each school building.

In response to the second question definite replies were received from twenty-four cities. The median practice in this case is two or three visits to each schoolroom.

Concerning the information received in response to the third question, Mr. Moore says: "A glance at the distribution of supervisors shows that there is no correlation between the *size* of a city and the *number of supervisors* which it may have. For example, Schenectady with 89,000 people has more supervisors than Kansas City, Missouri with 324,000 people; or St. Joseph with 78,000 people has more supervisors than Dallas with 160,000 people; or Colorado Springs with 30,000 people has twice as many as Binghamton with 67,000 people."

"It is quite evident from the data that a city reaches what is considered a full corps of supervisors by the time it attains a population of from 30,000 to 40,000, and that its increase in supervisors thereafter will in no sense keep pace with its increase in population."

Replies were received from thirty-three of the forty cities in regard to the number of supervisors. A summary is given in the following table:

Number of Supervisors	Number of Cities
32 to 35	1
28 to 31	0
24 to 27	0
20 to 23	0
16 to 19	3
12 to 15	10
8 to 11 <i>Median</i>	10
4 to 7	9
0 to 3	0
	33

Since there are 33 cities or cases, the median is the seventeenth case, which case lies in the group of cities having from 8 to 11 supervisors; hence we conclude that a range from 8 to 11 is the proper number of supervisors for a city of from 30,000 to 100,000 population.

The answers to the fourth question which were received from the 33 cities ranging in population from 30,000 to 100,000 are summarized in the following table:

	Number of Supervisors
Health (doctors and nurses).....	87.5
Attendance.....	55
Music.....	50.5
Drawing.....	42.5
Assistant superintendent, supervisors of intermediate grades, and supervisors of tests and measurements.....	37.5
Physical education.....	36
Sewing.....	29
Writing.....	24.5
Primary grades.....	20.5

The National Education Association announces the appointment of a commission whose function is "to coordinate all agencies which are studying the problems of education and to work out a policy whereby these agencies will contribute to the program advocated by the Association." This commission consists of the following:

Jesse H. Newlon, Superintendent of Schools, Denver, Colorado, *Chairman*

W. C. Bagley, Editor-in-Chief of the *Journal*, Pleasantville, N. Y.

hn W. Withers, Dean of School of Pedagogy, University of New York, New York City

J. W. Studebaker, Superintendent of Schools, Des Moines, Iowa
 Mary D. Bradford, Superintendent of Schools, Kenosha, Wisconsin
 Walter A. Jessup, President, State University of Iowa, Iowa City, Iowa
 L. D. Coffman, President, University of Minnesota, Minneapolis, Minnesota
 Edwin L. Rouse, State Normal Schools, Peru, Nebraska
 J. G. Crabbe, President, State Teachers' College, Greeley, Colorado
 W. W. Theisen, Director of Department of Reference and Research, Cleveland, Ohio
 George Melcher, Director Bureau of Research and Efficiency, Kansas City, Missouri
 Virgil E. Dickson, Director of Research and Guidance, Oakland, California
 Burdette R. Buckingham, Director of Bureau of Educational Research, University of Illinois, Urbana, Illinois
 Thomas H. Briggs, Professor of Secondary Education, Columbia University, New York City
 Charles E. Rugh, Professor of Education, University of California, Berkeley, California
 W. F. Russell, Dean of College of Education, State University of Iowa, Iowa City, Iowa
 Annie Webb Blanton, State Superintendent of Public Instruction, Austin, Texas
 Jessie E. Colburn, Public School No. 61, New York City
 Phoebe E. Matthews, 153 Morrison Avenue, Somerville, Massachusetts
 Robinson G. Jones, Superintendent of Schools, Cleveland, Ohio
 C. P. Cary, State Superintendent of Schools, Madison, Wisconsin
 James W. Gowans, Superintendent of Schools, Winfield, Kansas
 Stuart A. Curtis, 246 Eliot Street, Detroit, Michigan
 Franklin Bobbitt, Professor of Education, University of Chicago, Chicago, Illinois
 Frank G. Pickell, Assistant Superintendent of Schools, Cleveland, Ohio
 Albert S. Cook, State Superintendent of Schools, Baltimore Maryland

The letter, a portion of which is quoted below, has so much interested us that we think our readers will also like to read it. With reference to this letter, a friend of ours writes, "This aptly illustrates the song sung some years ago by the Mandarin Yen How in that charming musical comedy *Son Toy*

Educational Research in China

"They do it in the West
 So of course it must be best
 And I mean to introduce it into China.' "

Mr. Francis P. Jones, who writes the letter, is principal of the Hinghwa Normal School at Hinghwa, Fukien, China. He is also a member of the Fukien Christian Educational Association. At the point where we begin our quotation from Mr. Jones' letter he has just been speaking of this association. Continuing he says:

"Before our meeting at Kuliang this summer, several missionaries had already begun the use of various tests. Mr. Irving Lacy of Yenping had translated Starch's reasoning test in arithmetic and had results from several hundred children, all of them in higher primary schools, i. e., grades five to eight. I had also given the Cleveland Survey Arithmetic Tests to all children in the six principal higher primary schools of our Hinghwa Mission. This amounted to about three hundred students. I may later be able to send you a graph or a detailed statement showing the results from this test in our schools here. As far as general arithmetic ability is concerned it shows our children to be approximately one year behind the children of the same grade in

American schools. This difference in attainment is due largely to the difficulty in getting good arithmetic teachers in China. The old Chinese schools did not consider arithmetic a proper part of the curriculum which was composed entirely of classical literature.

"We are doing our best to improve the quality of the teaching so that our children may come up to the grade of schools in America. The results which Mr. Lacy secured in his reasoning tests seem to show equal attainment between the children in our schools and those in American schools. It is, however, more difficult to draw a parallel there because the translation of problems from one language into another may result in increasing or decreasing the intrinsic difficulty of the problem.

"At the meeting of the Fukien Christian Educational Association at Kuliang this summer, the above work was reported on and the Bureau of Educational Research was established.

"Mr. F. B. Beach of Foochow has undertaken to adapt group intelligence tests for use in Chinese schools. Mr. Irving Lacy proposes to proceed with his reasoning tests. Mr. Walter Lacy of Foochow is working on geography tests and measurements and I have been asked to work on the problem of English tests for higher primary and middle or high school.

"One of the Professors in Canton Christian College, H. B. Graybill, has worked out a good dictation test in English, which tests understanding of English and ability to write it correctly. His test is composed of a series of nineteen sentences, beginning with a simple sentence like—'I see a boy,' and gradually increasing in difficulty. You will find a complete account of this test in one of the numbers of *Educational Review for China* (October, 1919).

"This is the only definite information that I can give you. Some of the higher government schools are working at this problem. The Government Teachers College at Nanking, of which Dr. P. W. Quo is President, is I think working along several lines. I have heard that tests in different subjects are also being worked out at other educational centers such as Pekin University and West China University, but I am not able to give you any definite information about them."

Section Q of the American Association for the Advancement of Science was in session in Chicago during December 28, 29, and 30, 1920. Section Q, A. A. A. S. The meeting on December 28 which was a joint session with Section I (Psychology), was devoted to the nature of mental abilities and their measurement. The particular topics are indicated in the following program:

The Correlation of Visual and Color Memory with Art Ability. Elmer E. Jones, Northwestern University, Evanston, Illinois.

The Measurement of Silent Reading. May Ayres Burgess, Russell Sage Foundation, New York City (not present).

Observations of Eye Movements in Reading. G. T. Buswell, University of Chicago, Chicago, Illinois.

Character and Conditions of Motor Rhythm as Related to Handwriting Movement. Paul V. West. University of Wisconsin, Madison, Wisconsin.

Measurements of Spelling in the Virginia Survey. F. S. Breed, University of Chicago, Chicago, Illinois.

Corrective Work in Reading. Wm. S. Gray, University of Chicago, Chicago, Illinois.

Analyzing Industrial Educational Requirements. E. K. Strong, Jr., Carnegie Institute of Technology, Pittsburgh, Pennsylvania.

The Interpretation and Application of the Intelligence Quotient. F. N. Freeman, University of Chicago, Chicago, Illinois.

Report on College Admission Tests. L. L. Thurstone, Carnegie Institute of Technology, Pittsburgh, Pennsylvania.

The Essential Criteria of Mental and Educational Tests. M. E. Haggerty, University of Minnesota, Minneapolis, Minnesota.

Combined Mental and Educational Tests. Rudolf Pintner, Ohio State University, Columbus, Ohio.

A Group Intelligence Scale for Primary Grades. F. A. Kingsbury, University of Chicago, Chicago, Illinois.

The Influence of Heredity, Maturity, and Training on Scores in Standard Tests. S. A. Courtis, Detroit Public Schools, Detroit, Michigan.

One's estimate of any program depends largely upon his personal interests. Thus in attempting to note the high points one doubtless reflects as much of his own personal interests as of the inherent nature of the numbers on the program. The following reports, however, appeared to stand out as distinctive.

Dean Gray reported in detail a case study of a fourth-grade pupil who was found to be extremely deficient in reading. His report together with other reports indicates that practically all failures in reading, except when due to a lack of native intelligence, can be eliminated by providing proper instruction for the pupils. The correction of reading defects, however, requires a careful study of the needs of the individual pupils and the provision of appropriate remedial instruction.

Professor Freeman presented data to show that there was considerable doubt whether the assumption that the I. Q. is constant is justified when it is based upon mental age as measured by group intelligence tests.

Dean Haggerty presented four criteria for judging mental and educational tests: (1) discrimination—a satisfactory test must show differences in ability where real differences in ability exist; (2) reliability—a second application of a test should yield measures which closely approximate the measures obtained from the first application; (3) significance—the traits measured should be significant, i. e., they should be included in the educational objectives; (4) standards—tests should be standardized both with respect to age (chronological) and school grade. Our present grade standards are inadequate. In the discussion which followed Dr. Thurstone suggested that the first three of these criteria might be included under the head of "validity" and that this characteristic of a test could be studied directly by correlating the measures yielded by it with an independent criterion of the trait covered by the test. This comment doubtless grew out of Dr. Thurstone's work with tests for admission to college where an independent objective measure of a student's success is obtainable. In this case it is possible to study the validity of such tests by directly correlating the measures yielded by it with the student's future success in college. This procedure cannot be applied when independent objective measures are not available. This is the situation with which we have to deal in the case of most tests of intelligence and school achievement.

Professor Pintner reported a plan for combining measures of intelligence and achievement in order to interpret more accurately the measures of achievement.

The keynote of this day's session as well as of the other sessions was voiced by the chairman, Professor Chas. H. Judd, when he pointed out that it was clearly evident that we should proceed very cautiously in interpreting the measures yielded by our present educational tests and that there is a distinct need for careful and detailed analysis before we can arrive at final conclusions. The uncritical use of tests is very likely to lead to erroneous conclusions.

On December 29 a joint session was held with the American Psychological Association. Since it is expected that a separate report of this meeting will be published in these columns it will be omitted from this account.

The program of Thursday morning, December 30, consisted of five papers. The first, by Professor B. R. Buckingham, was on a "Brief Method of Evaluating Test Material." Recognizing the need of a greater volume of such material and the difficulty of evaluating it by the direct method, the speaker considered the possibility of utilizing data already in hand to standardize educational material. It was an attempt to short-circuit the usual procedure and to investigate the results of an indirect method. He found that by combining twenty-five spelling words of undetermined difficulty with twenty-five whose difficulty was known he could determine the difficulty of the new words by using returns from three hundred children with an error amounting in no case to more than two columns on the Ayres scale, and in most cases to less than one column.

Dr. Carter Alexander, Assistant State Superintendent, State Department of Public Instruction of Wisconsin, set forth in a paper "Motives Successfully Utilized in Publicity" some of the social and psychological principles which ought to be observed in such appeals to the people. Dr. Alexander particularly deprecated the appeal to pity. He gave instances in which emotional cartoons and stories depicting the sad condition of the teacher entirely failed to produce the desired effect.

Although Dr. W. Randolph Burgess' paper was entitled "Teacher Preparation in Ten States," he had secured comparable data for fourteen states. The percent of college and normal-school graduates among the teaching forces in these states was taken as the index for teacher preparation. The states in order in regard to the proportion of trained teachers were: Massachusetts, Rhode Island, New Jersey, Connecticut, New Hampshire, Colorado, Minnesota, Montana, Wisconsin, Illinois, Virginia, North Dakota, West Virginia, and Kansas. The percent of teachers who were not graduates of either college or normal schools ranged from fifteen for Massachusetts to seventy-four for Kansas. The eastern states showed high records and the southern and middle states lower records. A more fundamental condition, however, was that the training of teachers was most extensive in states where urban conditions most largely prevail. An index number derived for each state on the basis of the number of trained teachers revealed a correlation between teacher preparation and the percent of urban population amounting to $+0.89$. Indeed, as Dr. Burgess pointed out, the problem of teacher training is largely a rural problem. The typical city teacher is a trained teacher. About half of the total number of teachers of these fourteen states were normal-school or college graduates. Among the ten states for which data were available over a ten-year period, there was an increase of 40 percent in the amount of teacher preparation between 1910 and 1920—although in the years 1919 and 1920 little progress was made. If present rates of progress are continued until 1950, the states now having the best record will have an average of nearly four years of college

or normal school training per teacher. The present average for the best states—Massachusetts, Rhode Island, and New Jersey—is two years.

Professor A. Caswell Ellis of the University of Texas presented a paper on "The Rating of University Professors." Professor Ellis had devised by an amalgamation of the judgment of college and university professors and students a score card for judging college teachers.

Owing to unavoidable delays, the paper of Professor Fletcher Harper Swift of the University of Minnesota which was scheduled for the morning session was postponed until afternoon. Professor Swift illustrated his paper by the use of a number of especially interesting slides. He set forth in considerable detail the development of school expenditures (with emphasis upon the sharp upward trend of the curve in recent years), the various sources of school revenue, the productiveness of these sources, and the relation between local, county, state, and federal sources. Professor Swift expressed the conviction that in the present state of our educational development the only agency which can adequately finance the schools and make them in fact, as they are in theory, universal, democratic, and free, is the state government.

On the afternoon of December 30 Professor L. M. Terman of Leland Stanford Junior University read a report by Dr. Grace Fernald on the teaching of children to read who were afflicted with aphasia or word blindness. Several cases were reported all of which were treated successfully. A series of articles on this topic by Dr. Fernald will appear soon in the *JOURNAL OF EDUCATIONAL RESEARCH*.

Professor Bird T. Baldwin, State University of Iowa, presented data which showed that the anatomical and psychological ages of children should receive consideration as well as chronological and mental ages in classifying them for instruction. A complete account of Professor Baldwin's work will appear soon in book form.

Mr. L. J. Brueckner of the Detroit public schools reported on their method of teaching English to adult foreigners. The essentials of the method involved using material which had practical content.

Mrs. Luella Pressey of Indiana University reported a critical study of Monroe's Standardized Silent Reading Tests. She found that when a test of this type was restricted to exercises based on prose paragraphs the correlation of one test with a similar test was very high (0.85). For the same group of pupils the correlation with similar tests based on poetry and upon selections from general science was 0.35 and 0.39 respectively. The conclusion suggests that different abilities are required for reading different types of material and that the validity of a test of this type can be greatly increased by confining the exercises to a single type of reading material.

The Spokane U. S. History test was devised in the latter part of the year 1919, with a view to correcting certain defects in other standardized Spokane U. S. history tests. It is so arranged that guessing is practically eliminated. **History Test** It is rather searching, having one hundred points on which answers are required, and yet requires an hour or less to give. The scoring of the papers is easy and exact, leaving nothing for the teacher to guess at. It is fairly complete as it is made up of twenty points in each of five sections, dealing respectively with dates, people, historic expressions, civic terms and causes in their relation with historic events.

In the first section twenty important dates are placed along the left-hand margin of the page and the twenty historic events with which they are associated are placed

in a different order down the center of the page. On the right of the page is a vacant column headed "Date." The instructions to pupils are, "Select dates from the column on the left and write them in the vacant column on the right, placing each date opposite the historic event associated with it."

A similar arrangement holds true of each of the other sections. The second section is here reproduced entire in order to illustrate the plan.

II

Select names from the column on the left and write them in the vacant column on the right, placing each name opposite the historic event associated with it.

Name	Historic Event	Name
Peary.....	Destroyed Spanish fleet in Manila Bay.....	.....
Sacajawea.....	Arranged slavery compromises.....	.....
Foch.....	Invented the telephone.....	.....
Lincoln.....	Leading Confederate General.....	.....
Fulton.....	Wrote the Declaration of Independence.....	.....
Dewey.....	Built the Panama Canal.....	.....
Pershing.....	Discovered North American Continent.....	.....
Roosevelt.....	Wrote the "Star Spangled Banner".....	.....
Bell.....	Invented the steamboat.....	.....
Washington.....	Guided the Lewis and Clark Expedition.....	.....
Goethals.....	Discovered the North Pole.....	.....
Magellan.....	Commanded allied armies in the World War.....	.....
Edison.....	Was President during Civil War.....	.....
Grant.....	Commanded American Forces in World War.....	.....
Clay.....	Was Revolutionary patriot, author and inventor.....	.....
Jefferson.....	Commanded "Rough Riders" in Spanish American War.....	.....
Lee.....	Discovered the Philippine Islands.....	.....
Key.....	First president of the United States.....	.....
Cabot.....	Leading Union General in Civil War.....	.....
Franklin.....	America's most famous inventor.....	.....

No. Attempted..... No. Right.....

The test was given in January 1920, to the 514 pupils completing the eighth grade at the midyear. The medians for the 28 buildings in which there were VIII^A classes ranged from 59.0 to 93.5. The city median was 78. The quartile medians were 59 to 69, 70 to 78, 78 to 82.5 and 83.5 to 93.5.

The boys ranked higher than the girls in all sections. The median for 236 boys was 81 and for 298 girls was 74.5. The lowest score was 27 and was made by a girl. The highest score was 100 and was made by one boy and two girls. Thirty-three pupils, or 6.4 percent, had a mark of 50 or less. As this is the average percent of failure in the Spokane schools, it was decided to call the passing mark 51 or above.

The results by ages correspond to those nearly always found, namely, that the younger pupils in a class are the stronger ones. One pupil eleven-years-old received

a mark of 92. Twelve pupils twelve-years-old had a median mark of 90. One hundred four pupils thirteen-years-old had a median mark of 84.5. Two hundred six pupils fourteen-years-old had a median of 77. One hundred thirty-three pupils fifteen-years-old had a median of 76. Forty-nine pupils sixteen-years-old had a mark of 71. Seven pupils seventeen-years-old had a mark of 61. Two pupils eighteen-years-old had a mark of 73.

Of a possible mark of 20 for each section, the median marks were 16 for dates, 20 for people, 17 for historic terms, 16 for civic terms, and 11 for cause and effect. It appears, therefore, that associations with persons are easiest and those of cause and effect most difficult.

The five easiest points in the order of easiness were (1) the name of the agreement ending the fighting in the World War; (2) the name of the first president of the United States; (3) the date of the beginning of the World War; (4) the name of the ship on which the Pilgrims came; and (5) the name of the boundary between the slave and free states.

The most difficult points in the order of difficulty were: (1) disputes over slavery as causing the Civil War; (2) the Civil War as bringing about national unity; (3) the industrial development of the New England states as giving rise to a protective tariff; (4) the lack of a strong, centralized government as the cause of the critical period; and (5) the invention of the steam engine and machinery as the cause of the growth of cities.

In tabulating the results of the test a separate card, 3 by 5 inches in size, was used for each pupil. On this card was entered the name, age, sex and building, together with the mark of the pupil in each of the five sections, and the total. The use of these cards made possible the easy segregation of the results and finding of medians. In the opinion of the writer the use of such cards is to be recommended as a great value in any similar work.

The use of the test seems to show that it possesses the following advantages:

1. Pupils understand what to do from reading the brief instructions given in the test itself, thus making unnecessary any explanation by the teacher.
2. The key accompanying the test makes it quick and easy to score, and eliminates any uncertainty as to the mark to be given.
3. It is our conviction after using the test that it points unerringly to the strength or weakness in the history work of the individual pupil or class.
4. The test is diagnostic in that a detailed comparison of individual or class results points out specific weaknesses.

ORVILLE C. PRATT

*Superintendent of Schools
Spokane, Washington*

Superintendent L. W. Keeler, Michigan City, Indiana, has furnished the Bureau of Educational Research with data from which the coefficient of correlation between scores yielded by the Illinois General Intelligence Scale and the Otis Group Intelligence Scale has been calculated. The coefficient of correlation for 124 pupils in the lower sixth grade is 0.83. For 83 pupils in the upper sixth grade it is 0.82. The Otis Group Intelligence Scale was given in September 1920, and the Illinois scale about two months later. The Otis scale had previously been given to

several of the pupils in the upper sixth grade in May 1920. The correlation between these two sets of scores for 64 pupils was found to be 0.76.

These coefficients of correlation are based upon I. Q.'s rather than point scores. They show a high degree of correlation between the measures yielded by these two instruments for measuring intelligence. This suggests that the two scales measure the same traits of pupils.

In the lower sixth grade the average I. Q. for the point score was 90.5. For the Illinois scale it was 89.9. In the upper sixth the averages were—Otis 106.2, Illinois 94.2. These averages suggest that the I. Q.'s obtained from the use of the Illinois scale are lower than the corresponding I. Q.'s for the Otis Scale. This in turn means that the mental ages yielded by the Illinois Scale are lower. Other data gathered by the Bureau of Educational Research indicate that the mental ages obtained by the Illinois scale are about one year and two months too low. This estimate is subject to revision on the basis of additional data which are now being collected. The use of this correction will insure more accurate mental ages. However, this corrected mental age should not be used in determining achievement quotients. To do so will introduce a considerable error in the quotients.

W. S. MONROE

National Association of Directors of Educational Research

(E. J. ASHBAUGH, *Secretary and Editor*)

Carter Alexander, Assistant State Superintendent, Wisconsin, reports that his research energies have been exerted in the following channels: publicity campaigns for better school support, state aid provisions, and the formulation of legislation needed in Wisconsin.

He calls attention to articles in the June JOURNAL OF EDUCATIONAL RESEARCH; July, August, and September *American School Board Journal*; and October *Educational Review*; also, the December *School and Society*. He also announces an article to appear shortly in the *School Review* and the *Elementary School Journal*.

Mrs. Margaret S. Brainard, Director of Educational Research, Martins Ferry, Ohio, states that her work this year has been largely along the lines of remedial measures following up the conditions revealed by the standard tests given for the past two years. She has been working with her superintendent on a bulletin of methods and devices for teachers of reading in the elementary grades. They have checked over the school library and prepared graded book lists as a stimulus toward home reading. She has planned to give the Thorndike Visual Vocabulary Test to discover the part played by deficient vocabularies.

Some intelligence testing has been done with both the Haggerty Group Test and the Binet Individual. Further testing with subject-matter and intelligence tests will

be made for the purpose of classification and study of progress of pupils doubly promoted.

She also reports the formation of an Ohio Educational Research Association at a meeting held at the university in December.

Dean Chas. Fordyce, University of Nebraska, reports the following items:

1. Group mental tests were given to all students of Teachers College of the university during the first semester. Results will be used with the grades given by instructors as a basis of determining scholastic standing.

2. Have used various educational tests, Haggerty Group Tests in grades, and the Terman Group Tests in the high school in several public schools.

3. Are giving the Ayres Spelling to rural schools of four counties for the purpose of establishing a norm in their state.

4. Making a comparative study of the Henmon, Starch, and Hanus Latin tests in four different public schools.

Miss Mary Bess Henry, Director of Research, Santa Ana, California, sends the following:

"The Santa Ana schools have extended the classification of pupils into groups according to ability and application. This system has been used for three years in our sixth grade and is now used in all classes from the sixth grade through the junior high, and a few in the senior high. The work expected of the slowest sections is quite different from that of the rapid sections. All children in the fifth, sixth, seventh and eighth grades have been given two group tests, Otis, Illinois Examination, National Intelligence or Terman, as well as standard tests in reading, arithmetic, spelling and writing. Trabue has been given in many cases as a third test. These records, with his school marks, record of health, vision and hearing, and estimates made by his five or six teachers of intelligence, temperament, dependability, initiative, ambition, neatness and conduct are sent to the grade or school to which he is promoted.

"Three special rooms for atypical children are maintained, with some attempt at grading. Two rooms care for the younger children. They progress in time to the central room, where one half the time is spent in manual training, sewing, and cooking. The usual handwork is prominent in all the special rooms. From the central room, the higher grade cases progress to the slowest sections of the seventh and eighth grades, where they have a differentiated course of study. These promotions have a very advantageous effect upon the high grade morons and borderline cases in the special rooms. A promotion seems to mean a great deal more to them than we have been led to expect."

Dr. W. A. McCall, Teachers College, Columbia, tells us that he and Dr. Trabue, under the direction of Dr. Strayer, are in charge of mental measurement for the Baltimore school survey which is now in progress. Also that form 1 of the Thorndike-McCall Reading Scale is ready for distribution. The scoring and computation of pupil and class scores have been very much simplified. He announces an article on method of scale construction in the January issue of the *Teachers College Record*, and a forthcoming volume on "How to Measure in Education" to be published by Macmillan.

Dr. M. R. Trabue, of Teachers College, announces the following lines of activity. He is directing studies of the different intelligence tests as to their relative values in:

1. Classifying pupils entering junior high school.
2. Determining the character of pupils eliminated from metropolitan high schools.
3. Placement of their own graduates.

He states he has a group of superintendents and principals from New York, New Jersey, and Connecticut who come in for criticism and instructions regarding tests and measurement work on Saturdays.

He also states that he and Dr. McCall have used the following pedagogical tests, which were not mentioned by Dr. McCall, in the Baltimore Survey: Courtis Arithmetic, Ayres Spelling, Thorndike Handwriting, Hillegas Composition Scale.

We are glad to announce the following new members to our Association during the past month:

Miss Margaret V. Cobb, Secretary of the Bureau of Mental Tests and Measurements under G. M. Whipple, University of Michigan. Miss Cobb has an A.B. from Radcliffe and an A.M. from Illinois. She has practically completed her work for the doctor's degree in the field of mental testing.

Miss Helen Davis, Director of the Bureau of Research, Jackson, Michigan. A.B. University of Illinois, with graduate work in University of Illinois and Carnegie Institute of Technology, specializing in the field of tests and measurements. Miss Davis states the following program for the work of her Bureau: Under her direction the teachers have given the National Intelligence Tests to all children from *III*B to *VIA* inclusive. Recommendations for classification will be made on the basis of these results. She is conducting an intensive course for kindergarten teachers in the use of the Binet-Simon test. Teachers will give this examination to all their pupils before the next semester, and all children entering the first grade in February will be classified on the basis of mental age. She has given about one hundred Binet examinations for the purpose of reclassification of pupils. Next semester it is planned to follow up work in the lower grades and testing in intermediate and high schools. Test results in grades above the sixth will be used not only for classification but for educational and vocational guidance.

Mr. Osborne Williams, Director of the Department of Educational Research and Vocational Guidance, Atlanta, Ga. A.M. Transylvania University, with some graduate work in the University of Chicago. He was a member of the Psychological Examining Board, Camp Hancock, for six months and assistant in Psychological Service, Walter Reed Hospital, for six months. At present the department is giving the Otis and the National Intelligence tests to the high-school freshmen, and some arithmetic and reading tests in the upper grades of the grammar school.

JOURNAL of EDUCATIONAL RESEARCH

VOLUME III

MARCH, 1921

NUMBER 3

THE EDUCATION OF TEACHERS IN FOURTEEN STATES¹

W. RANDOLPH BURGESS

Formerly Russell Sage Foundation, now Federal Reserve Bank of New York

The Annual Report of the Commissioner of Education of Massachusetts for the year 1920² contains a tabulation showing the educational qualifications of teachers in service in Massachusetts schools at ten-year periods from 1875 to 1920. The following table quotes selected figures from the detail given in the report.

TABLE I. EDUCATIONAL QUALIFICATIONS OF TEACHERS IN MASSACHUSETTS

Year	Percent Graduates of Colleges ^(a)	Percent Graduates of Normal Schools	Total Percent Graduates of Col- leges or Normal Schools
1874-75.....		19.4	19.4
1884-85.....		29.3	29.3
1894-95.....	6.3	36.0	42.3
1904-05.....	13.7	47.5	61.3
1913-14.....	16.0	55.3	71.3
Jan. 1920.....	16.8	69.1	85.9

(a) Includes some teachers who held both college and normal-school diplomas.

Table I indicates that in a period of 45 years the number of trained teachers in Massachusetts schools has increased from less than one-fifth to more than five-sixths of the entire force. It is

¹ The first of two articles on the education of teachers in service in the United States. The subject of the second article will be "The Rate of Progress in Teacher Preparation."

² Proof sheets of portions of the report have been furnished to the writer through kindness of Commissioner Payson Smith.

further notable that the rate of improvement during the war-disturbed years from 1914 to 1920 has been as rapid as during any period.

VALUABLE UNUSED FIGURES

The figures which have been quoted are interesting, however, not simply because of the facts which they reveal but also because of the type of inquiry which they represent. During the past few weeks the writer has been making a search through school reports to discover what figures are available on the educational preparation of teachers. The search revealed the fact that at least fourteen states have been carrying in their annual or biennial school reports data to show how many of the teachers in service are graduates of colleges or of normal schools. A number of other states list simply the normal-school graduates in service. Only in rare instances, however, have the figures for different years been brought into comparison to indicate whether or not there is improvement in the composition of the teaching force. In fact in very few of the reports have percents been computed to show what proportion of the teachers are college or normal trained. The United States Commissioner of Education has never attempted to collect figures as to the education of teachers for his annual report. In fact the only comparison between states in the matter of teacher preparation which the writer has been able to discover is contained in the report of the Commissioner of Education for 1891-1892, one of the early reports of Dr. William T. Harris. In a single table are brought together from different state reports the numbers and percents of normal-school graduates on the teaching force in ten states and the numbers and percents of college graduates teaching in four states. The states which were represented in this tabulation showed an average of about 16 percent of the teachers to be graduates of normal schools and 4 percent graduates of colleges, or a total of about 20 percent of the force graduates of some institution of normal or collegiate rank. The figures given were largely for New England and north central states and they were, moreover, on a number of somewhat different bases. Since that time the number of states attempting to keep some such record has more than doubled and mechanism of collecting data has been greatly improved.

RECENT STUDIES OF TEACHER PREPARATION

Recent statistical studies of teacher preparation have taken the form of cross-section samplings of special groups of teachers. Studies made by Coffman,³ Thorndike,⁴ and the Carnegie Foundation,⁵ while they yielded a fuller knowledge of the facts as to teacher preparation, and the relationships between the education, experience, and salary of the teacher, did not give a basis for year-to-year, or interstate comparisons. The latest study conducted by Strayer and Evenden for the American City Bureau⁶ gives an admirable basis for intercity comparisons of teacher preparation, and if repeated in future years can yield an index of municipal progress in this important particular. It does not give a basis for comparisons between states, or go back of the current year.

In this article the writer proposes to bring together for useful comparison the available facts as to the comparative education of the teaching force in fourteen different states. The first step will be to present the figures for these states and the second will be to propose a statistical method for facilitating ready comparisons between the records of different states and between the records of different years.

THE GREATEST COMMON DENOMINATOR

State reports carry figures for the educational preparation of teachers in diverse forms. The Massachusetts reports of recent years give the following:

1. Graduates of college and normal school
2. Graduates of college
3. Graduates of normal school
4. Graduates of city-training school
5. Graduates of secondary school only
6. Not graduates of secondary school

This represents in some respects the most complete classification encountered. Other states list besides the graduates the numbers

³ Coffman, Lotus D., *The social composition of the teaching population*, New York: Teachers College, Columbia University, 1911.

⁴ Thorndike, E. L., *The teaching staff of secondary schools in the United States* (U. S. Bureau of Education Bulletin, 1909, No. 4).

⁵ *The professional preparation of teachers for American public schools*. Bulletin number 14, New York 1920.

⁶ *Know and help your schools*. New York: American City Bureau, 1920.

of teachers who attended college or normal school but did not graduate and still others distinguish between those who graduated from state normal schools and those who graduated from other normal schools. One or two states have attempted to classify teachers by the number of years' training they have received beyond grammar school. As a rule the difficult decisions as to what should count as a year, the large amounts of clerical labor, and the cost of printing involved in this tabulation, have militated against its publication from year to year. The two figures common to the largest number of reports were the figures for college graduates and normal-school graduates on the teaching force.

THE GRADUATION STANDARD

While the use of these two figures is made necessary by the circumstances of the case they are about as satisfactory for the purposes of comparative statistics as any which could be secured without an extended independent inquiry. College and normal-school graduation have come to be terms with considerable definiteness of meaning. College graduation has in general come to mean four years of study beyond secondary school. Normal-school graduation has been in the past a much less definite term. The normal-school course might extend anywhere from one to four years and secondary-school graduation might or might not be required for entrance to the teacher-training course. In the past twenty years, however, there has been remarkable progress toward standardization. The recent report of the United States Bureau of Education on "Statistics of Normal Schools 1917-1918" contains a careful tabulation of entrance requirements and length of course in both state and private normal schools. It is clear from this compilation that with some exceptions normal-school graduation in this country now means the completion of two years of study beyond the equivalent of a secondary-school course. The exceptions are in two directions, towards a course shorter than two years and towards a course longer than two years. In general the states which have the largest numbers of normal-school graduates tend to have the longer courses of study and those which have the fewest normal-school graduates tend to have shorter courses. Therefore in making a comparison between states on the basis of normal-school graduates in service whatever error there is will be

in the direction of penalizing the better states and favoring the poorer. It is believed that the net result of this error is not large in the case of the fourteen states under consideration.

It will have to be conceded at once that the two figures for numbers of college graduates and numbers of normal-school graduates do not tell us all we should like to know concerning the educational preparation of teachers. Further information would be desirable showing the amount of work undertaken in normal school, college, or university which did not result in graduation. An ideal inquiry would reveal for each teacher the number of full high-school, normal-school, college, and university years completed. Summer school courses, short courses, and uncompleted or unsuccessful years would be turned into their full-year equivalents. Accurate statistics of this type are, however, peculiarly difficult to collect on a large scale and over a term of years because they involve much labor of compilation and much judgment on the part of the persons reporting.

The figures which are available, however, do give us the most essential facts which we want to know. College and normal graduation are two accepted standards of teacher preparation. The proportion of the teaching force in any state who have completed full courses of instruction at normal schools or colleges is a real indication of the kind and amount of training teachers are receiving. It is a measure of the extent to which recognized and accepted standards are being realized.

A TEN-YEAR PERIOD

The available figures from different states have been tabulated for a period of ten years from 1910 to 1920. This period has been selected because of the scarcity and diminishing reliability of figures before that date, and because a ten-year period gives perhaps the best indication of current tendencies. The latest published state reports are in the main for the year 1917-1918. For records of the school terms of 1918-1919 and 1919-1920 the writer is indebted to the chief school officers of the different states, who have been good enough to furnish data in advance of publication. In several instances the figures for 1920 had not yet been tabulated. The state school officers also checked through the figures for their states in order to detect any apparent errors.

FOURTEEN STATES IN 1918

For the school year 1917-1918, figures are available from fourteen states showing the total teachers in service and the numbers of these who were graduates of colleges or of normal schools. The data as they were taken from state reports, or furnished by state school officials, are shown in Table II.

TABLE II. PREPARATION OF TEACHERS IN FOURTEEN STATES
1918

State	College Graduates	Normal-School Graduates	Total Teachers
Massachusetts ^(a)	3,273	12,639	18,681
Rhode Island.....	441	2,055	2,934
New Jersey.....	2,537	11,184	16,689
Connecticut ^(b)	1,037	4,294	7,404
New Hampshire.....	653	1,139	3,068
Colorado.....	1,425	2,359	6,926
Minnesota.....	2,774	6,175	18,768
Montana.....	867	1,560	5,600
Wisconsin.....	2,090	4,868	16,745
Illinois.....	5,666	6,871	34,597
Virginia ^(c)	1,043	3,587	13,904
North Dakota ^(d)	698	1,774	7,712
West Virginia ^(c)	846	2,480	10,978
Kansas.....	2,241	1,957	16,398
Total.....	25,591	62,932	180,404

(a) Figures for Boston estimates on basis of percents in 1920.

(b) 1918-1919.

(c) Division between colleges and normal schools partly estimated.

(d) 1916-1917.

As the total number of teachers in public schools in the United States in 1918 was 650,000 the 180,394 teachers listed in Table II therefore represent between one-quarter and one-third of all of the teachers in the country. The group is representative of different parts of the country, although New England is somewhat too heavily weighted and the southern states are too lightly weighted. The amount of teacher preparation shown is probably somewhat greater than in the nation as a whole.

As far as possible only day-school teachers have been included in the table, and administrative officers excluded. As a rule the

whole number of different teachers rather than the number teaching at one time is given. On these and other minor points differences between the state reports have made entirely similar bases impossible. It is probable also that the figures from some of the states are lacking in completeness. It is believed that the figures are as accurate, however, as most figures similarly collected. Percents computed from Table II to show the proportions of college and normal-school graduates among the teachers of the different states are shown in Figure 1. The black portion of the bar for each state shows the percent of the teachers who are college graduates, the cross-hatched portion, the percent who are normal-school graduates and the hollow portion the percent who are not graduates of either normal school or college. Massachusetts leads the list with 17.5 percent of her teachers college graduates and 67.7 percent normal-school graduates. Five eastern states make by far the best records. Then follow five western and north central states. The two Virginias with North Dakota and Kansas are in the four bottom positions. The percent of college graduates runs from 21.3 in New Hampshire to 7.5 in Virginia, while the range of the normal-school figures is from 70 percent in Rhode Island to 12 percent in Kansas.

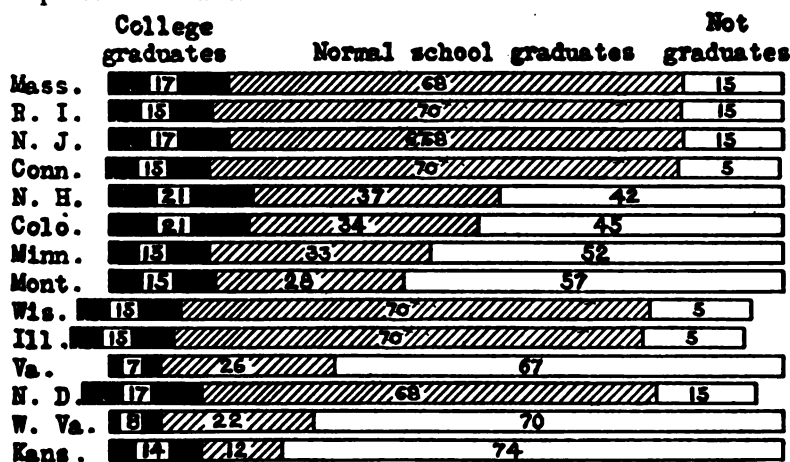


FIGURE 1. Percent of teachers in fourteen states who were college or normal-school graduates, 1918

If there were a total bar it would show that of the 180,000 teachers for whom figures are available almost exactly half are

college or normal-school graduates. If one were to take an average of the percents, giving each state equal weight, the ratio would be higher showing 55.5 percent of the teachers in the average state to be graduated from college or normal school.

A SINGLE INDEX NUMBER

It is clearly desirable to have one single number by which to express the amount of teacher preparation in a state. There should be for purposes of comparing states, tracing progress from year to year, or computing correlations a single measure of the diffusion of teacher training in the state. For this purpose it is proposed to use the average number of years per teacher of completed training beyond high schools. The figure may be com-

TABLE III. INDEX NUMBERS FOR TEACHER PREPARATION IN
FOURTEEN STATES IN 1918

State	Index Number
Massachusetts.....	2.054
Rhode Island.....	2.000
New Jersey.....	1.948
Connecticut.....	1.720
New Hampshire.....	1.588
Colorado.....	1.506
Minnesota.....	1.250
Montana.....	1.178
Wisconsin.....	1.082
Illinois.....	1.054
North Dakota.....	0.820
Virginia.....	0.816
Kansas.....	0.786
West Virginia.....	0.760
Total 14 states.....	1.266

puted for any state by multiplying the number of college graduates by four and the number of normal-school graduates by two, and then dividing the sum of these two products by the total number of teachers. The resulting figure indicates the number of years of higher training each teacher would have if all the years of complete training were distributed evenly among them. On this basis the index figures for fourteen states for 1918 are shown in

Table III. As compared with Table II, shifts take place in the positions of the four lowest states. Two of the states, Massachusetts and Rhode Island, have reached a point where if the years of completed normal-school or college courses were distributed evenly among the teachers, there would be two to each teacher. In four states the average training is less than one year per teacher. Among 180,000 teachers in fourteen states the average training is one and a quarter years.

ESSENTIALLY A RURAL PROBLEM

With the figures in this simplified form it is possible to examine a number of relationships by means of the Pearson coefficient of correlation. The coefficients are given in Table IV. The probable errors of these coefficients are not given, as they would be in ordinary conventional practice. There are two reasons for this. The first is that the number of cases is too restricted. The second

TABLE IV. CORRELATIONS BETWEEN INDEX NUMBERS OF TEACHER PREPARATION AND RELATED FACTORS IN FOURTEEN STATES

Related Factor	Coefficient of Correlation
Percent of population which is urban ^(a)	0.89
Annual salaries of teachers ^(b)	0.77
Percent high-school attendance was of total attendance ^(b)	0.66
Five educational elements of Ayres' Index Number ^(c)	0.68
Five financial elements of Ayres' Index Number ^(c)	0.34
Ayres Index Number ^(c)	0.44

(a) Figures from 1910 census showing percent of population in cities or towns of 2,500 population or over.

(b) *Report of the commissioner of education on the statistics of state school systems, 1917-1918.*

(c) Ayres, Leonard P., *An index number for state school systems*. New York: Russell Sage Foundation, 1920.

and more important reason is that these fourteen states do not constitute a random sampling from a very much larger number of states which might theoretically be brought into the computations by future successive samplings. In theory, the use of the probable error as a measure for determining the reliability of a coefficient of correlation rests on the condition that the data used are

a truly random sampling from an infinitely great, or at least exceedingly great body of possibly obtainable data. Since there are only forty-eight states in all, and since the fourteen states here used are a selected sampling rather than a random one, the conditions requisite for utilizing the device of the probable error do not obtain. The most notable feature of Table IV is the exceptionally high correlation between teacher preparation and the percent of the population of the state which is urban. This correlation is considerably higher than that between salaries and training. The two factors of inaccessibility of training institutions to the country girl, and unwillingness on the part of the trained teacher to go to the country school are evidently even stronger influences than amount of salary. If praise or blame were to be administered on the basis of the standing of the states in teacher preparation, the close relationship between a state's standing in this respect and the proportion of its population who are in the cities should not be overlooked.

It is apparently true that teacher preparation is more affected by the conditions of rural life than almost any other factor of school administration. The coefficient of correlation between the Ayres Index Number and the percent of the population which is urban is only 0.37. Between the five educational elements of the index number and the percent of the population which is urban there is a much closer relationship, expressed by the Pearson coefficient 0.71. Even here the relationship is not as close as that just noted with teacher preparation.

Further interesting evidence of the contrast between city and country in teacher preparation is found in a comparison of the figures of this study with those recently gathered from 359 cities of 8,000 or more population by the American City Bureau.⁷ The comparison is made in Table V. In order to bring the figures to a roughly comparable basis it has been assumed that six or seven years of education beyond elementary school as recorded in the American City Bureau study is the equivalent of normal-school graduation and that eight or more years is the equivalent of college graduation. The 359 cities are representative of all parts of the United States.

⁷ *Know and help your schools*. New York: American City Bureau, 1920.

TABLE V. PREPARATION OF TEACHERS IN CITIES AND IN ENTIRE STATES

Study	Number of Teachers	Percent College Graduates	Percent Normal-School Graduates	Percent with Less Training	Index Number
359 cities 1920.....	68,336	21.1	52.2	26.7	1.838
14 states 1918.....	180,394	14.2	34.9	50.9	1.266

The figures for cities clearly indicate that the typical city teacher is a trained teacher. Nearly three-quarters of those for whom the facts were ascertained were either college or normal-school graduates. These facts are especially notable because of the extended term of service of city teachers. The present teaching force is not the product of our present college, normal, and city-training school equipment; for the median teaching experience of teachers in these cities is just short of ten years and 30 percent have taught for fifteen or more years.

The fourteen states for which figures have been presented show on the average a population 50 percent urban. The figures for training in the rural districts must, therefore, be truly low to bring the state records so much under the city records. Unfortunately the rural figures are not carried separately in many of the states; so that an exact comparison is not possible.

TEACHER PREPARATION AND THE AYRES INDEX NUMBER

The figures of Table IV indicate that index numbers for teacher preparation correlate highly with the educational elements of the Ayres index number. That is the Ayres number while it does not measure teacher preparation directly, does do so to a certain extent indirectly. The correlations between teacher preparation and the five financial elements, and the total index are much less high. We may say that teacher preparation is a phase of school efficiency which runs in the same general direction as the various elements of the Ayres index number but is nevertheless distinct in its importance and significance. It is clear that figures on teacher preparation would be a valuable addition to the measures entering into the index number for state school systems. This

is only another way of saying that they are figures which might well be gathered every year on a uniform basis by the United States Bureau of Education.

SUMMARY

1. At least fourteen states have published in their school reports figures for the education of teachers in service but the records of different states have not heretofore been compared nor have computations been made to measure the progress from year to year.

2. A comparison of the records of fourteen states for 1918 indicates that Massachusetts has the largest percent of trained teachers. The eastern states in general show high records and the southern and middle western states lower records. Of 180,000 teachers in fourteen states practically half were college or normal-school graduates.

3. From data for college and normal-school graduates in teaching service it is possible to compute for any state a single index number for teacher preparation for any year.

4. Coefficients of correlation between index numbers for teacher preparation and other related factors indicate that more widespread teacher preparation is predominantly a rural problem. The states which have the largest rural populations have the most poorly trained teachers.

5. Figures on teacher preparation could with profit be added to the reports compiled by the United States Bureau of Education, and would, if they were accurately compiled, be a desirable addition to the data entering into the Ayres index number for state school systems.

MANUAL ARTS BASED ON HOME REPAIR

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This study was undertaken to determine what problems and processes would be involved in a manual arts course, based upon work which is done or may be done around the home by a handy man with a common carpenter's and painter's tools. The problems of investigation were: first, to discover the jobs; second, to list and classify them; and third, to determine what processes were involved.

THE JOBS

The method of procedure in the investigation was as follows:

1. By personal interviews with fifty people, I made a preliminary list of the things which they in their own experience had had to do or have done about the house. These people consisted of housewives of Columbia, Missouri, school teachers from various sections of the state who were attending summer school, real estate and rental men of Columbia, and business men. In conducting these interviews I explained what I wanted and asked the people to take twenty or thirty minutes to go into the matter in detail. At first I helped a little by asking if this or that had ever needed repairing and usually they took great pains to recall everything. When we had gone as far as we could, I asked specifically about other things which was mentioned previously by some one.

2. I supplemented these interviews by personal inspection of twelve houses—in many cases the dwellings of the people I had interviewed. Using a list of two hundred items, I made a complete survey, in a small rural community of Missouri, of the problems of household construction and repair. In this way I reached the point where additional inspection or additional conversation added only an occasional item to the list.

3. All the items were then grouped under general headings of painting, furniture repair, house repair in general, house repair inside, doors, windows, screens, general repair, shoe repair, sharpening, plumbing and metal work, and new things made for the house. In all there were 328 items. These were printed with the following directions. (The first section in painting is also included to show the form used.)

DIRECTIONS

Name.....City.....Date.....

Have you had any work in Manual Training?.....

Our purpose

To find out what has to be done about the house, the doing of which requires the use of tools.

What you are asked to do

First: Examine carefully the following lists of things which are suggested as possible things to be done.

Second: Take the list and with the help of your parents or the landlady examine the house in which you live. Underscore all things which need to be done. Also underscore all things which you, your parents, or landlady recall have been done in this house or any other house with which you, or they, have been acquainted.

Third: Write in the blank space provided all those things which need to be done or have been done, which are not found in this list. This is especially important, as we wish to make this list as complete as possible.

Fourth: Please fill this out tonight. Mark as directed above. Have sheets fastened together. *Bring them to your first class tomorrow.* Lay them on the teacher's desk as you enter.

Painting

Paint house, paint outbuildings, paint repairs, paint screens, paint interior woodwork, paint floor, paint gutter, paint tin roof, tint walls, enamel bed, varnish furniture, stain furniture, patch scarred varnish, remove varnish, varnish woodwork, varnish floors, shellac floors, oil floors, wax floors, clean and oil furniture, polish furniture, apply wood filler.

These questionnaires were presented in person to the students at assemblies in the Columbia High School, the University High School, and to the college students in the university shops. In all 430 blanks were used and returned. The frequency of mention of each job was then determined.

Assuming for purposes of study that these jobs would determine the content of a manual arts course, two alternatives presented themselves. First, the course might be taught as a project or home-project course, and the students might be given the jobs to do at home or in the shop. Or, second, the tool processes necessary to perform these jobs might be drawn off the jobs and the tool processes might be taught systematically or by the problem method. Of these two the second alternative was selected; and a type of analysis is shown in Table II.

TABLE I. THE 54 JOBS WITH A FREQUENCY OF MENTION OF 150 OR OVER. CLASSIFIED ACCORDING TO TYPE OF JOB

Rank	Fre- quency	Job	Rank	Fre- quency	Job
		PAINTING			PUT HANDLE IN TOOLS
1	271	Paint house	36	169	Rake
5	222	Paint floors	39	163	Hammer
7	219	Paint screens	41	161	Ax
9	211	Paint outbuildings	50	152	Hatchet
13	197	Paint interior woodwork			SHARPEN TOOLS
11	208	Varnish furniture			Knives
43	157	Varnish woodwork	2	253	Scissors
45	156	Varnish floors	4	224	Skates
27	183	Polish furniture	9	211	Ax
48	154	Clean and oil furniture	14	195	Lawn mower
31	176	Wax floors	49	153	
		FURNITURE REPAIR			PLUMBING
7	219	Tighten screws in furniture	31	176	Stop leaks in faucets
16	194	Put knob on drawer	41	161	Thaw frozen pipes
33	171	Tighten belt on sewing machine	48	154	Clean oil stove
36	169	Clean and adjust sewing machine			GENERAL REPAIR
52	151	Reseat chair	4	224	Put up clothes line
		SCREEN REPAIR	11	208	Paper room
12	198	Make fly swatter	16	194	Mend locks
16	194	Put new wire on old frames	18	193	Re-putty glass
24	188	Put new spring on screen door	20	190	Build fence
26	184	Rehang screen door	20	190	Hang shades
37	167	Put new hook on screen door	20	190	Plane tight door
45	156	Screen in porch	23	189	Stop rat holes
45	156	Hang window screens	23	189	Build chicken coop
52	151	Mend torn screen wire	26	184	Make hen's nest
			28	182	Fit and lay linoleum
			29	177	Make swing
			32	172	Put shelves in closet
			34	170	Make sled
			38	165	Set fence posts
			41	161	Mend window shades
			52	151	Set glass
			54	150	Make yard gate

This table should be read as follows: Painting the house ranked first in frequency and was mentioned 271 times.

The eleven highest frequencies were: painting the house (271); sharpening knives (253); sharpening scissors (224); putting up clothes lines (224); painting floors (222); painting screens (219); tightening screws in furniture (219); painting outbuilding (211); sharpening skates (211); varnishing furniture (208); and papering rooms (208).

TABLE II. DETERMINING THE TOOL PROCESSES

A. Tool Processes Used in Woodwork				B. Processes Other than Woodworking Used in the 54 Projects			
Number	Process	Number	Process	Number	Process	Number	Process
1	Planing.....	17	Laying-out.....	33	Plumbing or leveling.	47	Cutting glass
2	Scoring.....	18	Chamfering.....	34	Scribing to irregular service.....	48	Fastening with glaz- er-points
3	Sawing.....	19	Beveling.....	35	Stapling.....	49	Applying putty
4	Boring.....	20	Modeling.....	36	Mixing paint.....	50	Puttying nails, sta- ples, tacks
5	Sandpapering.....	21	Carving.....	37	Puttying holes.....	51	Removing old wall paper
6	Scraping.....	22	Mortising.....	38	Filling.....	52	Mixing paste
7	Bowsawing.....	23	Mitering.....	39	Applying paint.....	53	Cutting paper
8	Gauging.....	24	Fitting.....	40	Removing paint.....	54	Applying paste
9	Nailing.....	25	Superposing.....	41	Applying varnish.....	55	Hanging paper
10	Screwing.....	26	Doweling.....	42	Removing varnish.....	56	Brushing paper smooth
11	Glueing.....	27	Inlaying.....	43	Polishing.....	57	Tinkering—(general adjusting not redu- cible to processes)
12	Countersinking.....	28	Assembling.....	44	Applying wax.....		
13	Spokeshaving.....	29	Dadoing.....	45	Digging postholes.....		
14	Chiseling.....	30	Grinding.....	46	Setting posts in ground.....		
15	Gouging.....	31	Whetting.....				
16	Finishing.....	32	Filing.....				

TABLE III. PROCESSES USED IN 54 JOBS OF HIGHEST FREQUENCY^a

Rank	Frequency	Job	Process by Number (Table II)
1	271	Paint house.....	36, 37, 38, 39, 40
2	253	Sharpen knife.....	30, 31
4	224	Sharpen scissors.....	30, 31, 32
4	224	Put up clothes line.....	57, 35, 9, 45, 46
5	222	Paint floor.....	36, 37, 38, 39, 40
7	219	Paint screen.....	36, 39
7	219	Tighten screws in furniture.....	10
9	211	Paint outbuilding.....	36, 37, 38, 39, 40
9	211	Sharpen skates.....	30, 32
11	208	Varnish furniture.....	41, 42, 43
11	208	Paper room.....	51, 52, 53, 54, 55, 56
12	198	Make fly swatter.....	1, 3, 5, 9
13	197	Paint interior woodwork.....	36, 37, 38, 40
14	195	Sharpen ax.....	30, 31
16	194	Put knob on drawer.....	10, 57, 4
16	194	Put new screen wire on frames.....	9, 35, 57
16	194	Mend locks.....	57, 32, 10
18	193	Reputty glass.....	48, 49
20	190	Build fence.....	9, 3, 45, 46, 57
20	190	Hang shades.....	10, 57, 25
20	190	Plane tight door.....	10, 1, 25, 34
23	189	Stop rat holes.....	9, 57
23	189	Build chicken-coop.....	1, 3, 9, 28, 35
24	188	Put new spring on screen door.....	10, 57
26	184	Rehang screen door.....	1, 10, 57
26	184	Make hens' nest.....	1, 3, 9, 24, 28
27	183	Polish furniture.....	43
28	182	Fit and lay linoleum.....	34, 2, 17, 24 [18, 24, 25, 28
29	177	Make swing.....	1, 2, 3, 4, 5, 9, 10, 14, 16, 17,
31	176	Wax floor.....	44, 43
31	176	Stop leak in faucet.....	10, 57, 24
32	172	Put shelf in closet.....	1, 2, 3, 24
33	171	Tighten belt on sewing machine.....	57 [22, 25, 28, 24
34	170	Make sled.....	1, 2, 3, 4, 7, 9, 10, 13, 14, 17,
36	169	Clean, adjust sewing machine.....	10, 57
36	169	Put handle in rake.....	57, 13, 6, 24
37	167	Put new hook on screen door.....	10, 57
38	165	Set fence post.....	45, 46
39	163	Put handle in hammer.....	3, 6, 13, 24, 57
41	161	Put handle in ax.....	3, 6, 13, 24, 57
41	161	Thaw frozen pipes.....	57
41	161	Mend window shades.....	57, 9
43	157	Varnish woodwork.....	38, 42, 41, 43
45	156	Screen porch.....	9, 17, 28, 57
45	156	Varnish floors.....	42
45	156	Hang window screen.....	1, 3, 9, 10
48	154	Clean oil stove.....	57
48	154	Clean and oil furniture.....	57, 43
49	153	Sharpen lawn mower.....	30, 32
50	152	Put handle in hatchet.....	57, 13, 6, 24
52	151	Mend torn screen wire.....	57
52	151	Reseat chair.....	9, 10, 24, 25
52	151	Set glass.....	47, 48, 49
54	150	Make yard gate.....	1, 2, 3, 9, 10, 14, 17, 24, 28

(a) In ranking, when two jobs had the same frequency both were given the lower rank and the higher omitted; when three jobs had the same frequency the middle rank was used

TABLE IV. FREQUENCY OF THE PROCESSES INVOLVED IN THE REPAIR JOBS LISTED IN TABLE I

Rank	Job	Fre- quency	Rank	Job	Fre- quency
1	Planing	10	31	Whetting	3
2	Scoring	5	32	Filing	4
3	Sawing	11	33	Plumbing or leveling	0
4	Boring	3	34	Scribing	2
5	Sandpapering	3	35	Stapling	3
6	Scraping	4	36	Mixing paint	6
7	Bowsawing	1	37	Puttying holes	4
8	Gauging	1	38	Filling	5
9	Nailing	14	39	Applying paint	5
10	Screwing	15	40	Removing paint	4
11	Gluing	0	41	Rubbing varnish	2
12	Countersinking	0	42	Flowing varnish	3
13	Spokeshaving	5	43	Polishing	5
14	Chiseling	3	44	Applying wax	1
15	Gouging	0	45	Dig posthole	3
16	Finishing	1	46	Set posts in ground	3
17	Laying-out	5	47	Cutting glass	1
18	Chamfering	1	48	Fastening with glazer- points	2
19	Beveling	0	49	Applying putty	2
20	Modeling	0	50	Putting nails, etc.	0
21	Carving	0	51	Remove old wall paper	1
22	Mortising	1	52	Mix paste	1
23	Mitering	0	53	Cut paper	1
24	Fitting	12	54	Apply paste	1
25	Superposing	5	55	Hang paper	1
26	Doweling	0	56	Brush smooth	1
27	Inlaying	0	57	Tinkering (general adjust- ing not reducible to processes)	23
28	Assembling	6			
29	Dadoing	0			
30	Grinding	5			

In Table II a standard is found for judging the practical value of the common manual arts course for the communities studied. That there is little similarity between the two is remarkably clear. As one runs over the list it is noticeable that less than half the processes are taught either as projects or in elementary form in the present courses. However, this study was made not as a protest against alleged weaknesses of the common course but in a spirit of curiosity to see how such a course would appear. If

home repair and construction were the objective of the manual arts course then the present course would need to be radically changed. For instance, in painting a house processes numbers 36, 37, 38, 39, and 40 are used. These are mixing paint, puttying holes, filling, applying paint, and removing paint.

In Table III are shown the processes involved in performing the 54 jobs listed in Table I. In order that all processes listed be determined, all the jobs are analyzed in terms of processes not only of woodworking, but also of painting, etc.

When these have been derived it is possible to determine the relative frequency of each process. This has been done in Table IV, which shows that planing occurs ten times in the 54 jobs. Upon such a basis it would be possible to determine the more or less commonly used processes so that relative emphasis might be determined. It should be noted that the first 31 processes are those commonly taught in school shops. The remainder are not usually found in any manual arts course now in use. It is apparent that if home repair and construction be made the basis for a course in manual arts, it is not necessary to use the project method. For once the processes have been derived, it is a matter of choice as to whether they be taught systematically and in isolation from practical jobs as projects at home or as problems in the shop. The important point to bear in mind is that it is entirely practicable to draw off the processes from home projects and determine which of them to teach and emphasize.

THE DEVELOPMENT OF A CHART FOR ATTAINMENTS IN READING

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In an address before the teachers of the Rochester public schools, Dr. William S. Gray of the University of Chicago declared that there was a lack of uniformity in our aims in reading. Reflecting on this statement, we concluded that this lack of uniformity in *aims* in reading, if it really existed, would be likely to have a bearing on *attainments* in reading. Accordingly, we decided to ask each teacher in the elementary schools to state the three chief aims in reading.

When these replies had been tabulated it was perfectly evident that Dr. Gray was right. The replies brought forth, grade by grade, a great many vague and indefinite statements. One teacher, for example, gave the following as a legitimate first-grade aim in reading: "To lay the cornerstone o' all education." On the whole, however, we received a body of material worth putting into definite shape for a report back to the teachers. This led us to ask the teachers for a restatement of their aims after they had made a careful study of the first tabulation. The second set of replies was a decided improvement over the first. After again sending back a tabulation, a third request brought a body of material which was organized by a committee of teachers into grades and divisions. The result was a reading chart to which we have given the title "Attainments in Reading." The material contained in the chart is reproduced in connection with this article.

The process by which this chart was built up covered practically two years. During this time the Gray tests in reading were given in different schools; and the results were reported to teachers through institutes and conferences, and through printed articles in the *State Teachers' Journal*. The measurement work showed beyond doubt that the teaching of silent reading was deficient. This led to a more serious study of the problem of reading on the part of the whole teaching force.

Hitherto stress had been laid on oral reading attainment. The tests revealed that practically no special attention was being

given to the matter of correct "interpretation" of the material read. Children could read orally satisfactorily, but they were not being encouraged to look for the "central thought." They were not required to "reproduce" the subject matter of the text nor to show whether or not the "author's aim" had been sensed. Although the proper mastery of arithmetic, geography, and history is based directly on this ability to grasp the central thought, to understand the author's aim, and to reproduce, no general effect was being made to show the pupils the relationship existing between good reading and good marks in arithmetic, geography, and history. In other words, no definite attempt was being made in our schools to train the children in "effective study habits."

When it was brought home to us that reading was not just an isolated subject in our curriculum but was closely related to every other subject, we realized that an improvement in reading would bring about a corresponding improvement in the related subjects. This being true, the next step was to determine just how this improvement in reading ability could best be attained. In his talk to the Rochester teachers in 1919 Dr. Gray said:

The results of studies of the acquisition of reading ability enable supervisors and teachers to reach certain conclusions in regard to the aims of certain grades. First, emphasis should be placed on the content of what is read in each grade. Second, the first three grades should be devoted largely to the attainment of a high degree of fluency in oral reading. Third, some attention should be given to problems of silent reading during the primary grades. Habits of effective silent study should receive large attention during the fourth, fifth, and sixth grades. Fourth, ability to make keen, critical interpretation of what is read should be emphasized in the sixth, seventh, and eighth grades.

This, briefly, is what we are now trying to do in Rochester. The final threshing out of the aims suggested by the teachers resulted in four clear-cut statements essentially the same as those given above by Dr. Gray. In the form of the chart as actually placed in the hands of the teachers these were entered in the left-hand column under the general caption "Reading Results." To the right of each statement of aim and under the proper grade designation were given specific directions for accomplishing the aim. Thus the chart is not a group of *suggestions*, but an actual course of study; and it has been officially adopted as such by the board of education. In order that the reader may obtain a correct idea

3. Encourage drawing books from the public library for project reading.
4. Keep a record for the grade, showing title and author of all books read during the semester.
5. Encourage oral reading at home to give others pleasure.
6. Assign to individual pupils interesting short stories to be read at home for the purpose of telling to the class.
7. Assign poem to entire class for silent reading. Then select several children to read stanza which they have enjoyed.
8. Arouse desire to read good literature by interesting the class in one of the great writers. Encourage a search on the part of the individual pupils to see who can read the greatest number of selections by this author. Pupils keep individual list of selections or books read.

Sixth Grade

1. See suggestions for previous grades.
2. Discuss current events. Elaborate upon fourth and fifth grade work by having pupils make individual collection of newspaper clippings and magazine articles which pertain to projects being studied in geography, history, etc.
3. Stimulate interest in reading library books by each month writing on the board a list of several worth while books for the children to read independently.
4. Keep several interesting books upon a reading table and permit individual pupils to read these whenever other work is finished. Frequently add new books and call attention of class to them.
5. Develop the habit of pupil's keeping an individual record of all books, short stories, poems, magazine articles, etc., read. Insist upon exact title, author and source being noted. Contests will stimulate this work.
6. Begin a more intensive study of poems, by helping the pupils to recognize and appreciate the various pictures or ideas which the poem aims to convey.

II. ECONOMICAL AND EFFECTIVE STUDY HABITS

- A. ANALYSIS—(1) *Central thought*; (2) *Author's aim*; (3) *Characters*; (4) *Problems*.
- B. CORRELATION—(1) *With previous experience and reading*; (2) *With similar material*.
- C. JUDGMENT—(1) *Value*; (2) *Validity*.
- D. INTERPRETATION.
- E. REPRODUCTION.

Kindergarten

1. Interest pupil in reading as a thought process, through incidental reading such as looking over shoulder while teacher reads.
2. Have children reproduce poem or story in their own words.
3. Teacher or child repeat rhyme which has been memorized and a child or entire group supply rhyming words.

4. Teacher read story already familiar to the children. Stop at frequent intervals and have children tell the next thing that happened.

First Grade

1. Give special attention to content of what is read.
2. Have children pick out words, phrases or groups of words from the sentences.
3. Have children read nursery rhymes and familiar short stories to gain power in reproducing the thought.
4. For thought getting, have children reproduce what has been read the previous day.
5. Have children read silently with the idea of telling the story to the class.
6. Have children relate materials read to previous experience.
7. Have children follow accurately either printed or written directions.
8. Lead children to find important idea or ideas of a selection.
9. Have children read questions silently and give answers orally.
10. Write brief descriptive sentences about a pupil and have children guess who is described.
11. Ask questions about thought unit or page that has been read silently.
12. Give dramatization and picture study a prominent place in thought getting.
13. Lead children to observe sequence of important ideas.

Second and Third Grades

1. Lead children to find answers to simple problems, later to more difficult ones.
2. Have children relate materials read to previous experience.
3. Have children follow accurately either printed or written directions.
4. Lead children to find important idea or ideas of a selection.
5. Lead children to find a series of closely related points.
6. Develop attitude and habit of looking for meanings in all reading exercises:

NOTE:—Put questions on the board and have children read to find answers to questions. Let children question each other on a selection which has been read. Let children tell meaning of words by giving other words that could be used instead. Children should be able to answer accurately any questions after one reading of a simple selection.

7. Train children to remember and reproduce.
8. Have children suggest appropriate titles for a story or for various parts of a story.
9. Develop the habit of finding simple quotations.
10. Lead children to find the central thought.
11. Lead children to find descriptions.
12. Have the children find the part of selection which gives most knowledge of a certain character.
13. Have children find elements of time and place.
14. Have children compare characters in stories to those in life. Have them select chief characters and minor characters.

Sixth Grade

1. Find the central idea in still more difficult paragraphs and long stories. Careful analysis and clear thinking required.
2. Find the author's aim or purpose in all types of selections ordinarily assigned. Judgment of pupils refined by estimating extent to which author realized his purpose.
3. Discover problems for study and investigation in connection with content subjects. Pupils given opportunity to read for a day or two to discover problems which should be studied in connection with a given topic.
4. Find a series of closely related points in difficult selections and material drawn from several sources. Statements carefully worded. Relationships clearly indicated by form of organization.
5. Determine the relative importance of statements in more or less difficult material. Pupils required to discuss relative values freely and to criticize the organization and relative value of various parts of assigned material.
6. Associate material read with previous experience in selections containing references to various fields such as history, geography, nature study, etc. Relationship to these general fields recognized and brought out by pupils.
7. Find answers to thought-provoking questions which are asked by pupils or teacher in relatively difficult selections; in material from various sources selected in part by pupils.
8. Select facts which relate to a problem under discussion in difficult passages and in material selected independently by the pupils. This requires training in looking up topics in textbooks and books of reference.
9. Draw valid conclusions from material read in difficult selections and material drawn from various sources. Pupils required to state conclusions and to give evidence which supports them.
10. Judge the validity of statements in all material read. Critical attitude encouraged. Pupils trained in the various types of source material in determining the validity of statements.
11. Remember and produce material from several sources, organized and put in form for a coherent, clear-cut presentation.
12. Train in keen, critical interpretations of difficult material. Pupils trained to distinguish between passages which need careful study and those which do not. Special training provided in the use of appropriate helps and in keen interpretations of materials.
13. Dramatize selections or single chapters from any long selection. Make definite assignments for home reading to groups of pupils in order that they may work out the necessary details for simple dramatization.
14. Discuss title. Why has author chosen title? After reading part of story let children suggest suitable titles. Show relationship between title and story.

15. Find important units of thought. Choose a name for important divisions of the story. Write name chosen, introductory and closing words. Emphasize the limits of complete thought units by requiring pupils to read to class introductory and closing words.

III. ECONOMICAL AND EFFECTIVE USE OF BOOKS

A. LIBRARY—(1) *Card index*; (2) *Reference books and indices*; (3) *Encyclopedias*.

B. HELPS—(1) *Notes*; (2) *Index*; (3) *Glossary*; (4) *Chapter headings*.

Kindergarten

1. Encourage children to bring their own attractively illustrated story books to be enjoyed by the whole group.
2. Encourage children to bring stories and pictures. These may be assembled into a booklet which might be made for first grade or for an absent member of the class.
3. Train pupils to turn pages without tearing them.

First Grade

1. Encourage children to bring alphabet books with pictures and names.
2. Develop on the board stories of a few short sentences about a common experience or descriptive stories. Afterward print these stories on sheets and have children combine into booklets.
3. Select primer with attention to content.
4. Have lessons on use, handling and care of books; proper position, how to turn pages, order of paging and exercises in finding given pages rapidly.
5. Emphasize the importance of clean hands and care in handling books.

Second and Third Grades

1. Direct attention to book, title, author, illustrator, publisher, date published, table of contents. Develop skill in finding titles in table of contents.
2. Direct attention to differences in same story as told in different books:
NOTE:—Have silent reading of different version of a story which has been previously developed.
3. Direct attention to interesting books to be read independently, on some project or problem.
4. Complete training in finding pages quickly.

Fourth Grade

1. See suggestions for second and third grades.
2. Give instruction in use of table of contents, chapter headings, glossary, etc. Teach these points only in the most simple form.
3. Give instruction in use of several books to secure information on a given problem.
4. Give training in the economical and effective use of dictionary.

5. Continue word drill and phonetic analysis of monosyllabic words with opportunity provided for application.
6. Develop accuracy and independence in word recognition.
7. Finish phonetic analysis of monosyllabic words and lay foundation for polysyllabic words.
8. Complete flash card exercises of longer phrases and sentences.
9. Complete essential training in fundamentals of oral reading with naturalness of expression.
10. Have oral reading in real audience situation to gain ability to read clearly and effectively.

Fourth Grade

A. Silent Reading

1. Have at least half of the reading silent reading.
2. Have silent reading on projects in connection with history, geography.
3. Give opportunity for quantitative silent reading with special instruction in the art of effective silent reading.
4. Allow children to read easy, interesting stories for short period, securing rhythmical sweeps with few fixations as child is absorbed in story.
5. Give speed drills in reading for thought. Borrow supplementary readers from lower grade.
6. Encourage pupils to reread simple, familiar material. Place a time limit and see how many pupils approach the standard rate.
7. Give informal or standardized tests both for comprehension and rate. Give the class standards to be obtained and allow pupils to keep their own scores so that they may know their progress.

B. Oral Reading

1. Review phonetic rules and principles.
2. See suggestions for previous grades.
3. Drill on word analysis for content and pronunciation.
4. Give attention to syllabication and accent.
5. Begin in this grade a systematic study of the dictionary. Drill on alphabetic arrangement of words to the third letter (see Course of Study in English). Emphasize purpose of words in heavy type at top of page.
6. Develop habit of consulting dictionary for pronunciation and meaning of unfamiliar words. Show value of diacritical marks in this connection.
7. Lead children to determine meaning of unfamiliar words by context.
8. Provide audience situations for oral reading. Occasionally require a summary by individual pupils of what has been read to class.

Fifth Grade

A. Silent Reading

1. See suggestions for previous grades.
2. Increase amount of silent reading to about ratio of 60 to 40.
3. Extend time for reading interesting stories to secure better rate.

4. Provide opportunity for silent reading from several books for the purpose of collecting information in connection with some project being studied.
5. Try to determine by means of informal or standardized tests the individual difficulties children encounter in silent reading.

B. Oral Reading

1. Emphasize all points noted for third and fourth grades.
2. Extend the study of the dictionary. Make daily assignments in spelling, etc., of definite words for which the dictionary should be consulted.
3. Place a greater emphasis on word analysis in derivation of meanings.
4. Encourage each pupil to keep individual lists of the meaning of all new words for which the dictionary has been consulted.
5. Continue the study of the rules of accent and syllabication. Apply rules to new polysyllabic words encountered in reading.

Sixth Grade

A. Silent Reading

1. Amplify all points noted for third, fourth and fifth grades.
2. Give special drill on any points noted for previous grades in which your individual grade seems to have difficulty.
3. Locate individual difficulties through the use of informal or standardized tests.
4. Increase amount of silent reading to about 70 to 80.
5. Motivate silent reading of reference material by definite assignments in connection with projects or problems being studied.
6. Help pupils to recognize the difference between quick reading with slight attention to details and careful, intensive reading by training them to quickly scan a paragraph or page for the purpose of deciding whether its content is worthy of careful study.

B. Oral Reading

1. Provide for special drill on any points previously noted which have not become habituated by the class.
2. Insist upon the independent use of the dictionary when needed.
3. Encourage pupils to be alert in detecting errors in their own pronunciation and generous in helping other pupils to overcome their errors.

In order to bring the matter definitely to the attention of all concerned every teacher in the system was provided with a copy of the chart for personal use and for display in the classroom. It was discussed, in detail, at the general institute held just previous to the opening of school in September, 1920; and it has subsequently been taken up at various principals' meetings. The principals have reported the results of these meetings back to their teachers. As a consequence of all this the teachers are fully alive to the situation.

Already suggestions for improvement are coming to the central office from principals and teachers. The chart is not regarded as a perfect piece of work by any means. It is to be revised next year in the light of this year's experience and many of the suggestions, now on file, will be incorporated in the next draft.

It is also planned to place not only a copy of the large chart in the hands of each teacher but also a chart of more convenient size which will contain only the general aims in reading and the specific directions for the grade in question.

The principals and teachers of Rochester have approached the problem of reading in a scientific spirit and with open minds. Good reading ability is not the cure-all for every ill, but we believe that if the children in our schools are really taught economical and effective use of books, and are helped to attain permanent reading interests, we have given them the tools with which they may work out with greater satisfaction to themselves and to us their immediate problems in arithmetic, history, and geography. To that end have we organized the "Attainments in Reading" chart.

INEQUALITY OF EDUCATIONAL OPPORTUNITY

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A STUDY OF THE SCHOOLS IN A MICHIGAN VILLAGE

We hear a great deal today about equality of educational opportunity in America. It is difficult, however, for one who devotes much time to visiting rural, village, and city schools to hear this doctrine without vigorous protest. At any rate, one is led to insist upon a distinction between equality and identity of opportunity.

Identity of opportunity means that the same opportunity is open to all pupils regardless of their abilities and interests. Equality of opportunity signifies that the pupil is offered opportunities in accordance with his abilities and interests. Accepting this distinction there is, in a very general way, identity of opportunity. But, when we consider an area as great as that of a country, even identity is apparent and not real, since one school has adequately trained teachers, another has teachers of little training; one possesses ample equipment, another has none; and one is provided with a modern, comfortable building, while another has a building unfit for school purposes. On the other hand, we have scarcely begun to consider equality of opportunity; in truth, many have not yet been convinced of the desirability of equality as opposed to identity. The general practice is to require all pupils to study the same subjects in the same way, and to make no distinction between mentally deficient and bright pupils; nor between those mechanically gifted and those who possess special abilities in other fields. All must be passed through the same "mill"; individual differences must be disregarded.

It is true that the problem of equality is being worked out with a fair degree of success in some schools, but these are relatively few in number and are confined very largely to cities. The schools in which least progress is being made are those of the small village and rural community. In this paper we are concerned, primarily with the village school. The following analysis involves an examination of the pupils, teachers, buildings, equipment, and the course of study.

THE PUPILS

In a certain village employing five teachers, the Binet test was given to the entire school, consisting of the twelve grades. Table I shows the distribution of the pupils according to intelligence (I. Q.) and school grades. It will be readily observed that somewhat more than one-half of the pupils are below normal intelligence; and that the proportion of feeble-minded, borderline, and dull cases is abnormally large.

TABLE I. CLASSIFICATION OF PUPILS ACCORDING TO INTELLIGENCE (I. Q.) AND SCHOOL GRADE

Classification	I. Q.	GRADE												Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Genius or "near" genius.....	above 140													
Very superior.....	120-139	3		1		1			1					6
Superior.....	110-119	7	1	1		1	4							14
Normal.....	90-109	4	4	5	4	7	3	3	3				1	34
Dull.....	80-89	11	6	5	2	7		3	3		3	1	1	42
Borderline.....	70-79	1	2	3		1	1	2	2	2	2	2		18
Feeble-minded moron.....	50-69	3		2		1			2					8
Imbecile.....	25-49	1												1
Totals.....		30	13	17	6	18	8	8	11	2	5	3	2	123

This last fact is made especially evident in Table II which exhibits at each intelligence level a comparison between the number of children in this school and the number which we should find in a typical school of the same size.

It will be observed at once that the number of pupils below normal is unusually large. This condition is at least partially explained by the fact that in the village there has been a selection of families based upon industrial intelligence; that is, many of the workmen showing considerable ability have been directed to larger centers, places in which greater skill or foresight is required. Besides, the work in the industry supporting this village involves more drudgery than the same industry in neighboring villages and cities.

TABLE II. COMPARISON WITH TYPICAL SCHOOL

Intelligence Quotient of Pupils	Number of Pupils (entire school)	Number to be Expected If School Is Typical	Deviation from Normal
120-139	6	8	2
110-119	14	16	2
90-109	34	74	40
80-89	42	16	26
70-79	18	7	11
50-69	8	1	7
25-49	1	1(?)	.....

In Table III, the language spoken in the home of the pupil is shown, together with the number speaking each language at the different mental levels. An examination of the table brings out the fact that, of the English speaking pupils, 56.6 percent are below normal; of the Finnish, 53.6 percent; of the French, 61 percent.

TABLE III. LANGUAGES SPOKEN IN PUPILS' HOMES

Intelligence Quotient of Pupils	English	Finnish	French	Italian	Swedish	Total
120-139	5	1	.....	.....	.....	6
110-119	6	6	2	.....	.....	14
90-109	15	12	5	1	1	34
80-89	21	13	6	1	1	42
70-79	11	5	2	.....	.....	18
50-69	2	3	3	.....	.....	8
25-49	.....	1	.....	.....	.....	1
Total.....	60	41	18	2	2	123

A comparison of the pupils speaking English only with those speaking a foreign language in the home shows that a somewhat higher percent of the former are below normal intelligence, the ratio being 56.6 to 55.5. In giving the tests all pupils not speaking or understanding English well were tested in their native tongue. I have found in testing a large number of children who speak a foreign language in the home that after they have asso-

ciated with English-speaking children for a year and a half or two years they test as high in English as in their native language.

TEACHERS

The teachers of the grammar- and high-school grades are normal-school graduates, and have taught five years or more. They are fairly well prepared for most of their work. The remaining three teachers are high-school graduates, have had *six weeks* of normal-school training, and have taught from one to five years. Of course, these teachers are almost wholly unprepared for their work, especially for teaching those pupils who speak only a foreign language. The lack of preparation is illustrated by the fact that in many cases these pupils receive no direct instruction in the English language, but are required to remain in school throughout the day in order that they may "pick up" the language by hearing others speak it.

TEACHING EQUIPMENT

The equipment is meager. Two of the five rooms are provided with globes and maps for the teaching of geography. Each of the elementary grades has two sets of supplementary readers, which are old and in bad condition. The school has no library facilities.

BUILDING

The building was originally a one-room school, but, as the population of the village increased, two additional rooms were built on the ground and two above the three. In so far as one can see there was no design or plan except to provide a place to keep the pupils during school hours. The heating, lighting, and ventilation are extremely bad. Two rooms are separated by a beaver-board partition only. In case of fire, there are but two narrow exits. The building, set in the middle of a sand lot, cannot be kept reasonably free from dirt and dust; the grounds have neither trees nor grass and are too small for play purposes. And, as is very commonly the case in village and rural schools, the toilets are a disgrace to a civilized community.

DISCUSSION

A few observations concerning the adaptation of the course of study to the intelligence of the pupils are pertinent. As shown in Table I, the pupils of the school are distributed as follows in

regard to mentality; imbecile, 1; moron, 8; borderline, 8; dull, 42; normal, 34; above normal, 20. The imbecile cannot profit by the work of the school and should not be in this school at all. The morons cannot learn enough reading and arithmetic to be of particular value to them. Although they might be taught to do simple forms of mechanical work, no opportunity is offered in this field. The borderline cases may profitably be taught reading, writing, and the fundamental operations and very simple fractions in arithmetic. They might, if given the opportunity, acquire considerable skill in certain kinds of industrial work, but the school offers nothing in this field. The dull pupils may profit by much that is found in the ordinary course of study, but additional time and considerable work of an industrial character should be given them. Finally, no provision whatever is made for the pupils above normal; these receive the same training as those of lower mentality. It is thus clear that within this school there is identity of opportunity, but nothing that resembles equality, as far as providing for the different levels of mentality is concerned.

The fact that more than one-half of the pupils speak a foreign language in the home presents a difficult problem, particularly from the standpoint of teaching citizenship. In these homes scarcely any reading material is found except the foreign press, and this is often hostile to the institutions of our country. The pupils of this school are taught citizenship—if it may be dignified by this term—in the same way as children of the thoroughly American home; that is, they are taught a few dates in history, more or less disconnected facts about the government, the names of the presidents, and other points which are, for the most part, memorized with but little appreciation of their meaning. In order to exert a greater influence upon these pupils, the work of the school should be extended to the home; the parents as well as the pupils should be taught to read and to speak the English language. This would insure a type of reading matter more genuinely American for the home, and would develop a more favorable attitude towards America and things American. The school in some of the more progressive communities is taking the initiative in developing such an attitude, but in this village nothing is done in that direction, consequently the children (as well as the community and the state) suffer. That is, the child of the immi-

grant is not afforded an equal opportunity with the native child to become a good citizen.

When we examine the teachers, equipment, and building, we find scarcely a shadow of either equality or identity of opportunity, in comparison with the opportunity afforded by the better schools of today. In the latter the teachers are mature and well trained; and they employ much of the best material and most effective methods known to the educational world. The buildings are clean, well lighted, properly ventilated, and attractive; and the teaching equipment is modern and adequate. But in this village almost everything that goes to make up a modern school is lacking. Both building and equipment are wholly inadequate for obtaining the best results, and the majority of the teachers are immature and lack training. The pupils of this school are, therefore, clearly at a disadvantage with those of many other schools.

Although this village school is somewhat exceptional in regard to the mentality and nationality of its pupils, it is not unusual in other respects. It represents a common type found throughout the United States. The cause of such conditions is chargeable chiefly to one of our false notions of educational democracy, namely, the complete control of schools by local authorities. The remedy lies in the creation of a larger taxing unit; in adequate supervision by the county or state; in giving authority to the county superintendent (who must be free from political influence) to name or to nominate teachers; and in providing a central officer to condemn buildings and to prescribe modern types, without endangering his position through any sort of political chicanery.

THE USE OF MEASUREMENTS IN A SMALL CITY SCHOOL SYSTEM

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Up to the present time the measurement of the product of education, in most cases, has been left to the research student or to the school administrator. The results have been used either for writing theses on educational research, or for showing the superintendent or principal the condition of a school or class with reference to a set standard. The systematic use of standardized tests as a direct aid in teaching has been very limited. The classroom teacher has been unable to see the value of such measurements, not only because she knows little of the principle of measurements, but also because, as often happens, she does not even see the results of tests given to her pupils. Frequently, therefore, the teacher after scoring tests according to definite instructions, turns over the results to some one higher in authority without herself making any practical application of them.

Consequently many teachers have come to look on standard measurements as something which involves a great deal of extra work for themselves, and which seems to be of no practical value to anyone. Again, teachers who have had the meaning of scores explained to them, often raise the objection either that these scores do not give any additional information concerning the pupils or that they are so unreliable as to be of little value. Speakers at educational gatherings frequently emphasize the fact that it is useless to give tests unless something is done about them afterward; but they fail to say specifically what should be done.

In beginning the systematic use of measurements in any school system, the necessity for gaining the cooperation of the teachers is evident. With this in mind a department of measurements was established in the Richmond, Indiana public schools in the fall of 1919. The director of the work was also part-time principal of one of the grade buildings. The aim of the department was to make standard tests available for the classroom teacher, and to show her specifically how the results could aid in teaching. Since both educational and mental measurements were used (each as a supplement to the other), they will be discussed together.

Testing was not forced on any school or on any teacher, but announcement was made that tests and information concerning them would be supplied when called for. At first there was little response. In the beginning therefore, the work was carried on chiefly at Baxter School over which the director had supervision. A group intelligence test was given to all the children in this school, and the Binet test was given to the very bright and to the very dull children. The Courtis Silent Reading Test and the Woody Arithmetic Scale, Series A, were also used in the proper grades.

The pupils who made high scores on both the intelligence and the educational tests were allowed to advance more rapidly than the normal rate of progress. Several did three half grades in one year. Those who were very dull were given, as nearly as possible, work suited to their ability. The ratings secured from these tests enabled the teachers to see each child as an individual problem and to aid him in overcoming his peculiar difficulties. "The greatest good to each pupil" thus becomes the slogan instead of "the greatest good to the group."

In the first three grades the pupils were grouped according to ability in the different subjects. Both the educational and the intelligence tests were used to make these groups as homogeneous as possible in ability. A pupil was sometimes in the highest group in reading and in the average group in arithmetic. The grouping was always kept flexible so that a child, whose improvement in any subject justified promotion, could be advanced to the next higher group. The brightest pupils were given more work than the average or slow pupils, and were often used as leaders for the slower pupils. A child of inferior ability was not expected to do average work. An effort was made to keep each child working up to the level of his capacity. In the upper grades the pupils of very low ability were sometimes excused from the less essential subjects like history and geography; and they were allowed to spend an extra amount of time on English, reading, writing, and arithmetic.

Long before this work in the Baxter School had been as thoroughly organized as has been described above, teachers and principals in other schools began to be heard from. They first asked that individual mental tests be given to those children who were especially poor in their work. When this request was complied with, some of these children were found to be subnormal; and

others were found to be normal but lacking in push and determination. When the teachers learned the difficulty, they were enabled better to deal with each child as an individual problem.

Soon requests from the various schools for group mental and educational tests became so numerous that it was decided to extend the tests over the whole city, provided there was no serious objection among the principals or teachers. The intelligence tests used were the Pressey Primer Scale and the Pressey Cross-out tests. The educational tests were the Courtis Silent Reading Test and the Woody Arithmetic Scale.

In order to "sell" this work to the teachers, a meeting was held in each school building. The value of the tests as an aid in understanding the child as an individual problem and in grouping pupils according to ability was discussed. The diagnostic value of educational tests was stressed as of especial importance. The use of the results in comparing one class with another and with a standard was also emphasized. The limitations of existing tests as absolutely accurate means of measuring a child's ability at any one time without regard to temporary conditions was explained. The teachers were told to use caution in forming any definite and far-reaching conclusion from the results of any one or two tests. The results from all the tests, both educational and mental, combined with their own judgments and the opinions of superiors must be taken into consideration.

These suggested applications of the tests were carried out to some extent in all buildings, but by some teachers much more than by others. The attitude toward the principle of testing is highly gratifying. All teachers in the city, so far as I know, are now advocates of intelligence and educational ratings as an aid in fitting methods of instruction to the needs of pupils. This result of the first year's work alone was well worth the time and money which has been spent in establishing the system in the schools of Richmond. It paved the way for an organized and widespread system of procedure in 1920-1921.

During 1919-1920 group intelligence tests were given to practically all children from the first grade through the junior high school, and the Binet test was given to about 160 pupils. Most of the pupils who were given individual examinations were selected from those who were very poor in their work and who scored very low on the group test. Twenty-seven were found to have I. Q.'s

of 69 or below. This means that the highest of this group will probably never develop beyond the mental level of eleven years—i. e., beyond ability to do fifth- or sixth-grade work—in the same time that the normal child would finish high school. Thirty made a score of 70-79 I. Q., which means that the highest of this group will probably never rise above the mental level of normal children of twelve or thirteen years. There were many other pupils in the system who would have made similar scores, but who were not examined because of lack of time. There are without doubt some errors in these scores, but it is certain that a large majority of these pupils will never be able to do the regular school work, and that they will always be a serious problem in the classes. A special school should be established for these children where they can be taught the essentials in reading, arithmetic, writing, language, music, and hygiene. But much of their time should be spent in some kind of manual training which will prepare them better to meet life in the outside world and to become self supporting.

The Courtis Silent Reading Test was used in grades IIIB to VIA, and the Woody Arithmetic Scale in grades IVB to VIIIB.¹ In a number of classes these tests were given two or three times in order to measure improvement and the effect of special methods of teaching. Other tests were used in smaller numbers with various classes.

The application of test results may be illustrated by giving some specific instances in which tests were of special value to teachers and pupils. In one second grade the intelligence tests showed that the pupils ranged from moron to very superior in ability. They were arranged into groups as homogeneous as possible taking into account the results of the tests, the scholarship records, and the judgment of the teacher. The members of the slowest group learned much more rapidly when taken from the regular classes. One boy with an I. Q. of 52 had been in school for a number of years without being able to read at all. In a group where other children were not greatly superior to him, he learned to read easy material. Until this arrangement was made the teaching went entirely over his head. On the other hand, the brightest group did much more than the normal amount of work for the second grade. Six of the brightest pupils were put into the next higher grade, and their present success indicates that they will continue to advance at more than the normal rate.

¹ At Richmond, Section B is low and Section A high in each year grade.

The Courtis Silent Reading Test was given to a very slow IIB class four times. It was given in October, January, March, and May. The score for the four tests was as indicated in the following table:

	Test			
	1	2	3	4
Speed.....	90	75	105	150
Questions.....	12	16	14	25
Comprehension.....	35	50	80	85

These results include only the scores of the children who were there for all four tests. After each test the class was divided into three groups: the first, below standard both in speed and comprehension; the second, below in speed only; the third, below in comprehension only. With this arrangement the teacher was able to give to each child the special work he needed. The class in June scored above standard in all points. This increase in ability could not have been accomplished by teaching the class as a whole, or by grouping the pupils without regard to their individual needs. The children of this class knew the standard score for their grade and whether their own score was above or below it. The fact that they knew this helped them to work more intelligently to overcome their own difficulties. The teacher of this class, though skeptical as to the value of tests at the beginning of the year, is now an enthusiastic advocate of them.

There are a number of instances where the tests were of special value to certain children. An over-age girl in the IA grade made a very high score in reading. She was skipped to the IIA grade and continued to do good work in reading. If her record is maintained she will be skipped again and work off her retardation.

A third-grade boy was unable to make any score on the Gray Oral Reading Test. Since he was suspected of being feeble-minded, he was given the Binet test. This test showed him to be normal mentally; and accordingly further effort was made to find the cause of his poor reading. His eyes were tested with the letter chart and seemed normal. When questioned, however, he reported that the letters looked as if "someone had put a wet

blotter on the book" and blurred them. His eyes were treated and fitted with glasses; and at the close of the year he scored 39 on the Gray Oral Reading Test.

K. T., a boy six years seven months old, was in the IA. His mental age was found to be seven years ten months; and his I. Q. was therefore 119. His score on the Gray Oral Reading Test was 63, which is much above standard. He was promoted to the IIA and did above average work. He was promoted to IIIA at the close of the year.

F. A., a boy in grade IIA, was eleven years old. He was found to have a mental age of nine years three months. His I. Q. was 84. He was suspected of being feeble-minded, but was really only slightly below normal. He was promoted to IVB grade and passed.

The chief value of the work in measurements for the year was that the teachers came to accept such measurements as of assistance in understanding children as individual problems, in grouping children according to ability, and in establishing more or less definite standards of attainment. Data were gathered to show the need of special classes for the subnormal. If these classes are established, the regular teachers will be relieved of their most difficult problems, and will thus be enabled to give more time to the normal pupils.

The work of the department in the future will be to organize the system so as to make possible a comparison of classes and schools; to apply the results in such a way as to affect methods of teaching, grouping of pupils, and modifications in the course of study; and to have direct and full supervision over whatever special schools are established, deciding which pupils are to be assigned to such classes, and what subjects are to be taught in them. The director should have authority to advise on special cases of double promotions and of failing pupils. The results of educational tests interpreted in the light of mental ratings would be very valuable in checking up the effectiveness of the various experiments in methods of teaching. Measurements should be extended into the junior and senior high schools where grouping according to ability is possible to a greater extent than in the grades. In order to carry work forward effectively every effort must be made to obtain the good will and cooperative spirit of teachers and principals.

A STUDY IN INTELLIGENCE AND EDUCATIONAL CORRELATIONS

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The study here presented was carried out with a unit group of seventh-grade pupils in one of the public schools of Fresno, California.¹ All the tests were given during a term of twenty weeks. Care was taken throughout to preserve uniform and normal conditions, and there was due observance of the instructions pertinent to the standard tests. The investigators had much previous experience in giving and scoring the various tests. Their purpose was to examine the reliability of the Binet-Simon Intelligence Test and the Otis Group Intelligence Scale as instruments in the adjustment and regrading of pupils.

Ninety-eight pupils participated in the experiment and, as far as possible, were given each of the following tests: Binet-Simon, Stanford revision, abbreviated scale; Otis Group Intelligence Scale; Courtis Standard Research Tests in Arithmetic; Ayres Spelling Scale, columns T and U, dictated; Trabue Language Scale C; visual vocabulary by the Thorndike Reading Scale B; comprehension in reading by the Courtis Silent Reading Test; writing for speed by the Ayres Scale, Gettsburg edition.

Before presenting the correlations between the intelligence and educational tests, it is interesting to note the extent of correlation between the Binet and Otis tests. This is indicated rather roughly in Table I. The figures in this table are based on the intelligence quotients derived from the respective tests.

TABLE I. COMPARISON OF RESULTS FOR THE BINET-SIMON AND OTIS SCALES

Tests	Highest Score	75-per-centile	Median	25-per-centile	Lowest Score	Average
Binet-Simon	133	100	89	83	56	92.4
Otis	154	103	88	67	40	87

These figures indicate a close correlation mathematically, especially in the upper range. The coefficient of correlation is 0.70

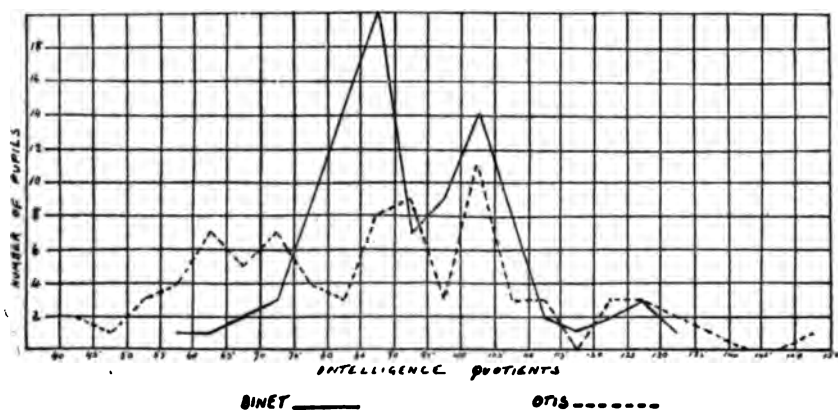
¹ Tests administered by Blanche Cummings, psychological expert in the public schools, Fresno, California.

by the Pearson formula (Probable Error, 0.04). This, though unquestionably high, is hardly large enough to prove a satisfactory general uniformity. This condition is emphasized by an examination of the rough data of the experiment, presented here only in part (see Table II). In these data a number of wide individual discrepancies occur, which may be due in some part to accidental vicissitudes in giving the tests. But whatever the cause, it is patent that the testimony of any single test should not be taken as final in estimating the intelligence of an individual.

The frequency distribution of intelligence quotients derived from each of the tests is shown on Figure 1. This discloses a wider range and greater irregularity of distribution in the case of the Otis test. It will be noticed that the distribution in the case of the Binet test is of fair normality.

Before taking up the educational correlations, a word should be said about the methods of scoring. In the case of the visual vocabulary test, the first, second, eleventh, and twelfth lines were omitted. The score was determined by the exact number of words defined, instead of by the method of inference suggested by Thorndike. In the spelling test, columns T and U of the Ayres scale were separately scored on the basis of 100 percent for perfect, and the results averaged.

FIGURE 1. COMPARATIVE FREQUENCY DISTRIBUTIONS FOR BINET AND OTIS TESTS



A difficulty was encountered in the scoring of results in the four fundamentals in arithmetic. The simple and commonly

practised plan would have been to score each individual on the number of "rights" in each operation. But it is recognized that there are two elements in each of the fundamental processes, rate and accuracy, or "attempts" and "rights." To score only the number right would have been to ignore the element of rate. What was wanted was a single coefficient to indicate true ability, which is relative to both rate and accuracy. To have derived such a coefficient by dividing "attempts" by "rights" would have been inaccurate, because $\frac{2}{2} = 100\%$ as does $\frac{10}{10}$, although the performance in one case is five times greater than in the other case.

The solution was to draw up a chart of ascending values, a portion of which is illustrated below. The numerator of the fraction-like expression indicates the number of examples attempted, and the denominator the number right. The figure to the right of each expression is the score for the performance indicated by the expression. The complete chart was extensive enough to measure the best possible performance, i. e., $\frac{24}{24}$. The same form was used in scoring all four arithmetical processes. The following portion of the chart illustrates the principle according to which it was constructed:

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An examination of the chart may disclose some apparent discrepancies. For example, are we justified in giving a small score to no attempts and no rights, and a zero score to six attempts and no rights? The principle of the scale demands this condition at its lower extreme; but it can well be justified by the assertion that it is better to know nothing and to know that you know nothing, than to know nothing and to think that you know something. But again, are we justified in giving a higher score to six attempts and three rights than to two attempts and two rights? And if we are so justified, then how about giving a larger score to two attempts and two rights than to six attempts and two rights? Can we say that power in addition, for example, ascends in this order: $6/2$, $2/2$, $6/3$? It must be admitted that there is some interesting ground here for debate; but to the writer the assumption seems reasonable. We must point out that some of the following computations show as great correlation between intelligence and arithmetic as here scored, as between intelligence and some of the other educational subjects. Further, it must be noted that the chart is a regular ascending scale from the poorest performance to the best. The plan is presented for what it is worth, and criticism is invited.

Table II shows how the rough data were arranged for the purpose of studying the correlative positions of the various scores. In all, there are four such tables, but only one of them—the smallest—is reproduced here. The method of arrangement in these tables demands a careful explanation. The study is one of rank correlation, and the procedure was as follows. The mental ages derived from the Binet tests were placed in a vertical range from the highest to the lowest, equal ages being placed in parallel. The entire range was found to be from nine and a half years to fifteen years. This range was divided into four equal parts. It was then found that 9 pupils fell into quarter 1, which was the highest quarter; 35 fell into quarter 2; 29 into quarter 3; and 22 into quarter 4. The nine pupils who fell into quarter 1 were entered on Table II. The scores of these same pupils in the Otis and various educational tests were then ranged and divided into quarters in the same manner as just explained for the Binet test. The table finally showed not only the scores but the number of the quarter into which each score fell, for each of the nine pupils respectively, in each subject. This same method of tabulation

TABLE II. HOW THE ROUGH DATA WERE TABULATED FOR THE NINE PUPILS WHO FELL INTO THE UPPER QUARTER OF THE MENTAL-AGE RANGE BY THE BINET TEST.^a

Pupil Number	BINET		OTIS		ADDITION		SUBTRACTION		MULTIPLICATION		DIVISION		SPELLING		VISUAL VOCABULARY		LANGUAGE		READING COMPREHENSION		WRITING SPEED			
	I. Q.	M. A.	I. Q.	M. A.	Score	Quarter	Score	Quarter	Score	Quarter	Score	Quarter	Score	Quarter	Score	Quarter	Score	Quarter	Score	Quarter	Score			
1	107	15	1	106	15	1	89	3	158	3	89	4	90	4	82	2	71	1	14	2	100	1	62	4
2	128	14-6	1	85			106	3	226	2	241	1	387	1	91	1	70	1	13	2	98	1	80	2
3	126	14-6	1	102	12-6	2	108	3	294	1	204	1	251	1	95	1	58	2	16	1	97	1	111	1
4	120	14-6	1	124	15	1	16	4	133	4	40	3	110	3	81	2	67	2	13	2	96	1	72	3
5	103	14-6	1				160	2	206	2	114	4	89	4	62	3	65	2			100	1	56	4
6	133	14	1	154	15	1	275	1	226	2	205	1	252	1	92	1	64	2	17	1	97	1	84	2
7	128	14	1	106	12-6	3	204	1	157	3	158	3	111	3	88	1	67	2	15	2	100	1	72	3
8	115	14	1	127	14-2	1	225	1	203	3	179	2	183	2	74	2	58	2	14	2	98	1	80	2
9	107	14	1				134	2	205	2	90	2	158	2	54	4			10	3	91	2		

The table shows the Intelligence Quotient (I.Q.), the Mental Age (M.A.), and the number of the quarter into which each pupil fell, according to each mental test. The score and number of the quarter for each of the other tests is shown.

^aThe scores are not comparable as between any of the subjects, except intelligence. The numbers of the quarters are comparable throughout, and form the basis for the study of the rank correlation, with the modification explained in the context.

was followed for the pupils falling into each of the other quarters by Binet mental age, thus producing four tables.

The preliminary theory was that pupils falling into quarter 1 by mental age should tend to fall into the corresponding quarter in the educational subjects; that those falling into quarter 2 by mental age should tend to fall into quarter 2 in the educational subjects; and so for the pupils in the other two quarters. But there is a fallacy in this simple scheme for studying correlations; for example, a child may score close to the bottom of quarter 1 in mental age and near the top of quarter 2 in addition, and his actual correlation in that case would be closer than that of a pupil who fell near the top of quarter 1 in mental age and near the bottom of quarter 1 in addition. This factor is inherent in the entire scheme, and practically negates the plan unless we provide a correction in our calculations.

In the matter of this correction, consider the group of pupils who fall into quarter 2 mental age. All of them who fall into quarter 2 in all the educational subjects show, for our purposes, a perfect correlation. But the pupils in the *lower* half of quarter 2 mental age may rightfully claim correlation with educational subjects to the extent that they fall into the *upper* half of quarter 3 in those subjects. And the pupils in the *upper* half of quarter 2 mental age may claim correlation with educational subjects to the extent that they fall into the *lower* half of quarter 1 in those subjects. To figure the total correlations for the pupils in quarter 2 mental age, we might count the number of times the educational scores rank in the identical group, and add half the times that educational scores rank in contiguous groups. This is admittedly a loose and a too liberal makeshift. To be true to the actual mathematical probabilities, we should have to take somewhat less than half the correlations with contiguous quarters although the difference would in fact affect our results but slightly. Our correction approximates the true condition.

The correction just explained applies to mental-age quarters 2 and 3. But since mental-age quarters 1 and 4 have each but one contiguous group, we may add, in each of these cases, *all* the times that educational scores rank in the contiguous group.

Thus for each mental-age quarter or group we allow a leeway for overlapping equivalent to one-quarter the range in each educational subject. The corrections as here explained will be made in the computations that follow.

Table III shows the frequencies of correlation with the nine educational subjects for the pupils in the respective mental-age quarters according to the Binet test. The second vertical column contains the nine pupils who, as already mentioned, fell into mental-age quarter 1. The table discloses that three of these correlated by rank with two educational subjects, one of them with three educational subjects, one with four, one with five, one with six, and two with seven. So for each of the mental-age quarters. Only pupils taking all the tests were counted. For the entire number it is found that the median number of educational sub-

TABLE III. FREQUENCIES OF CORRELATION OF EDUCATIONAL SUBJECTS WITH STANFORD-BINET INTELLIGENCE TEST FOR EACH MENTAL-AGE QUARTER

No. of Educational Subjects Correlating	No. of Pupils Correlating				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Totals
1	0	0	0	2	2
2	3	1	0	6	10
3	1	3	3	4	11
4	1	3	9	2	15
5	1	10	5	2	18
6	1	8	4	2	15
7	2	3	0	0	5
8	0	0	0	0	0
9	0	0	0	0	0
Totals	9	28	21	18	76

Table reads (second line): Of the 9 pupils in the first mental-age quarter, three showed rank correlation with performance in two subjects; of the 28 pupils in the second mental-age quarter, three showed rank correlation with performance in three subjects; etc.

jects correlating with mental age by rank is 4.5 or, since there were nine subjects, a correlation of 50 percent.²

Table IV duplicates the method of Table III, except that the mental ages have here been determined by the Otis group test. The median number of educational subjects correlating by rank, for the entire number, is 4 or 44 percent.

TABLE IV. FREQUENCIES OF CORRELATION OF EDUCATIONAL SUBJECTS WITH OTIS GROUP INTELLIGENCE SCALE FOR EACH MENTAL-AGE QUARTER

No. of Educational Subjects Correlating	No. of Pupils Correlating				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Totals
1	0	0	1	2	3
2	1	0	1	2	4
3	3	1	0	3	7
4	6	2	8	4	20
5	2	9	3	2	16
6	4	3	4	2	13
7	2	1	0	0	3
8	0	1	0	0	1
9	0	0	0	0	0
Totals	18	17	17	15	67

It would seem, from this study, that there is only a fair relationship between attainment in either of the intelligence tests and attainment in the educational subjects taken as a whole, notwithstanding the contrary testimony of various investigations. Of the entire number of possibilities for correlation, only 50 percent of them were realized, even after allowing for the correlation

²This percentage statement of correlation is not to be confused with the coefficient of correlation. The above is simply a statement of the amount of rank correlation.

with contiguous groups as explained in a previous paragraph. From the present testimony there is not even the expectation that all pupils will come up to the 50 percent correlation, as equal numbers will fall considerably below and above that median. The writer admits the novelty of the method of study here used, and willingly submits the question of its validity to minds trained in the science of statistical research.

It might be suggested, as a check on results, that we take only those pupils whose mental-age quarters were identical for the two intelligence tests, and that we compare their intelligence rankings with their educational rankings. This would tend to obviate error in the intelligence tests. For such an analysis see Table V. Of 28 pupils who fell into identical mental-age quarters, this table shows how many of them found a rank correlation with one educational subject, how many with two, and so on. The median number correlating in this case is 4.25, or a correlation of 47 percent.

TABLE V. FREQUENCIES OF CORRELATION OF EDUCATIONAL SUBJECTS WITH BINET AND OTIS SCALES WHERE THE LATTER WERE IN AGREEMENT AS TO MENTAL-AGE RANK

No. of Educational Subjects Correlating	No. Pupils Correlating by Mental-Age Rank
1	1
2	2
3	3
4	6
5	8
6	7
7	1
8	0
9	0
Total.....	28

We may next take up the question of how each educational subject compared separately in rank with mental age. Table VI presents this comparison, the Binet mental-age rankings being used. We might here have expected a greater correlation for the more intellectual subjects than for those representing mere skill, but such distinction is not evident, except in the case of language which, it will be remembered, was measured by the Trabue Completion Scale. Various other investigations have shown a high correlation between this scale and certain standard mental tests, a fact that argues well for the validity of our own investigation. In the case of reading comprehension, we should have expected a high correlation if the Kansas or Monroe reading test had been used. The Curtis test is in fact standardized only through the sixth grade, and the indications were that it was too easy, in its intellectual elements, for the seventh. Our test did, in fact, show a fair range of performance, but the variation was probably due largely to sensory-motor factors.

TABLE VI. FREQUENCIES OF CORRELATION OF SEPARATE EDUCATIONAL SUBJECTS WITH MENTAL AGE BY THE BINET TEST

Subject	Addition	Subtraction	Multiplication	Division	Spelling	Visual Vocabulary	Language	Reading Comprehension	Writing Speed
No. pupils taking test.....	93	93	94	94	89	85	87	90	89
No. of correlations	45	45.5	40.5	45.5	49	43	56.5	46.5	46.5
Percent of correlation.....	48	48	42	48	55	50	64	51	51

The conclusion to be drawn from the entire study, if valid, is not encouraging. The tables show constantly a correlation that may be expressed as 50 percent, which means this: that the median pupil found a rank correlation with educational subjects to the extent of just half the opportunities. This is just the correla-

tion that would fall by chance. This last point is probable by the following reasoning: a pupil in mental-age quarter 2 would correlate with addition, for example, if he fell into quarter 2 in that subject, or in the lower half of quarter 1, or in the upper half of quarter 3. In other words, that pupil has a range of two whole quarters in addition in which to be marked plus in correlation, according to our scheme; leaving two quarters in which to be marked minus. That pupil has a "fifty-fifty" chance, which is almost exactly the amount of correlation that our investigation showed for the median pupil, counting all subjects.

We began this experiment with the purpose of testing the validity of the intelligence scale as an instrument in the regrading and regrouping of pupils. If our conclusions are to stand, the verdict must be colorless. Our results at any rate demonstrate that it is a dangerous thing to take the testimony of any single intelligence test as final proof of inferior or superior capacities in the conventional subjects. There is at present a tendency to push the intelligence tests into the hands of unscientific enthusiasts throughout the teaching force. Although these people may be trained in the accurate administering of the tests, it is in the uses they may make of results that the danger lies.

Editorials

CHILD ACCOUNTING

Is the once powerful tribe of child accountants passing off the scene? Assailed by hostile forces, is it like a nation of aborigines dwindling first to hundreds and then to scores and dozens and finally to the lone survivor, the erstwhile chief of a forgotten clan?

Twelve or fifteen years ago child accountants were first coming into prominence. Those were the days of the Thorndike-Ayres-Falkner-Winship controversy over elimination. The Psychological Clinic was born and thrived and dwindled. In its pages and elsewhere the controversy was carried on. Thorndike began it with his cryptic "The Elimination of Pupils from School." Falkner with far less insight but with rare statistical skill, Ayres with his lucid style and his promise of better things statistically, and Winship with his rhetoric, multiplied evidence and generated heat as to the correctness of the statement that only 40 percent of the pupils who enter school continue to the eighth grade. The up-shot of the controversy seemed to be that you couldn't tell how many children survive to each grade unless by individual record cards you could actually trace their history from the time they entered school. As far as we know, however, such a study has not yet been made despite its obvious value.

This was also the period during which Dr. Maxwell of New York first brought forward the question of age with respect to grade. How vividly do we recall the attention which Dr. Maxwell's figures attracted. They were pronounced at conventions, printed in newspapers, and transmitted by word of mouth. One superintendent would whisper to another, "Have you heard of the awful conditions in New York? Forty percent of the children are too old for their grades!" With Pharisaical satisfaction yet gravely, as befitted the sad occasion, the other would reply, "Yes, the school conditions in New York are very bad; but then you know that is what one must expect when politics run the schools." Whereupon the two would no doubt fall to discussing the Tweed Ring and Boss Crocker and Tammany as though

machine politics were somehow indigenous to the metropolis. After reading the report of Superintendent Maxwell or perhaps after hearing it discussed at an N. E. A. meeting, other superintendents, desiring to show how much better their school conditions were, began to collect the information as to the ages and grades of the pupils under their care. Whereupon, like as not, in one community after another a solemn hush ensued. The real truth appeared to be that for the most part conditions in other cities were no better than they were in New York. Perhaps they were even worse.

As a result of the ensuing agitation a very general effort was made to reduce the percent of over-ageness. Very likely not a little energy was misdirected; but on the other hand it is almost impossible to overestimate the good results that were accomplished. The number of elementary-school graduates practically doubled in the ten years intervening between 1908 and 1918, although during the same time the population of the country increased no more than 15 percent. No doubt one of the causes of the large increase in the number of graduates was the effort to reduce over-ageness throughout the country.

With the appearance of standardized tests and scales and the development of what has been called the measurement movement, the activities of the child accountants diminished. Some of those who had been engaged in counting noses now began to count "attempts" and "rights." Moreover, as new students of education became active, they tended to turn away from child accountancy and to busy themselves with median scores, and later with mental ages and intelligence quotients. In other words, the progressive school people and the research workers became interested in cultivating a new field to the neglect of the old one.

We make no secret of the fact that we think this is unfortunate. Questions of enrollment and attendance as measures of the extent of school service, of promotion as the official record of accomplishment, of retardation and elimination as indices of the adjustment of means to ends of size of class, length of school term, and teacher-to-pupil ratio as criteria of organization and as data for use in computing unit costs—these questions have independent as well as relative value.

For example, in a certain city a very liberal policy of promotion has prevailed for several years. The promotion rate—i.e.,

the proportion of children on register the last day of the semester who were promoted on that day—was about 95 percent. Not long ago a testing program was instituted in this city. It involved the use of two or three standardized subject-matter tests as well as a mental test. The results showed that, according to grade standards obtained elsewhere, the pupils in this city were not up to grade. In fact, in the subject-matter tests they were fully half a year behind the standards pertaining to the grades in which they were classified.

On the other hand, the children were relatively young for their grades, and a very large proportion of them were therefore completing the elementary school and entering high school. Moreover, when the achievements of the pupils in the subject-matter tests were compared not with grade standards but with the mental ages of the pupils—in other words, when achievement was compared with what the endowments of the children would lead one to expect them to achieve—it was found that their performance was unusually good.

A similar testing program was carried out in another city of about the same size and located in the same section of the country. In this city a conservative promotion policy was in effect. Results obtained on the subject-matter tests were well above the grade standards. Nevertheless, there was a very general tendency for children to be too old for their grades. Pupils who were in no way defective according to the mental test were two and three years older than the standard ages.

Now, it is not difficult to see what is going on in these two cities. In the city we have first mentioned, grade standards are sacrificed in order that children may obtain the benefits of the richer curricula of the upper grades. In the second city it is the pride of the superintendent that no pupil transferred from his school system to another is ever reduced in grade. Indeed, he reports that not infrequently his pupils are advanced at once to higher grades.

Which of these superintendents is right? Is either school system properly characterized merely by the results of a testing program? Do we not need the supplementary data which child accountability provides? With them at hand, the superintendent in the first city can afford to continue his liberal promotion rate, take his losses in grade standards, and successfully maintain that his system is fulfilling the highest purpose of a school system,

namely, the training of the pupils. On the other hand, with the proper "accounting" of the children the superintendent in the second city will be revealed as paying an enormous price for the satisfaction of maintaining high standards in the grades. Or, more accurately, it is the children who are paying the price in wasted time and lost opportunity. No scheme of testing children can reveal the shortcomings of this system, for the tests cannot be given to the children who are not there, to the children, in other words, who should be in school and are not. Moreover, they cannot be given to the children who should be in the seventh or eighth grade when, as a matter of fact, they are in the fifth or perhaps in the fourth grade.

The condition is somewhat like that of a large elementary school in a certain city whose pupils on entering high school were found to be much stronger in English than the pupils coming from other elementary schools. After observing this long enough to be sure that it was really a permanent condition, the high-school principal sent the head of his English department on a three-day visit to the elementary school in question with instructions to find out how these results were accomplished. At the end of the first half day the head of the English department returned and reported that he had found out. He said that all but the very best were killed off before reaching the eighth grade. This elementary school had an enrollment of more than two thousand children, yet it had but one class of upper eighth-grade pupils. No doubt the precious grade standards in this school were a delight to the principal and teachers.

But one is impelled to ask whether schools are run for the purpose of maintaining grade standards. If they are, any one can have a good school. All one needs to do is to make promotion sufficiently difficult to secure. Under these circumstances a school becomes a ruthless organization in which unhappiness and failure are the lot of all but the few whose survival proclaims them the fittest. We are of the opinion that the schools are run for the benefit of the children rather than for the sake of standards. It is our notion that the promotion of a child is to be decided primarily on the basis of whether he will benefit more by advancement than by repeating the work of the lower grade. Nor is the question of his ability to benefit by the advancement to be decided entirely on the basis of the quality of work done in the lower grade. There

is a sense in which a higher law supervenes—the law in virtue of which a child should be promoted because of what he needs to learn rather than because of what he has learned.

In our judgment we need a revival of child accounting. We need it now more than we ever did. The undoubted advantages of the testing movement have been accompanied by some abuses. Superintendents and teachers are between the horns of a dilemma. On the one hand, grade standards ought to be high; on the other hand, in the bookkeeping of the school the accounts of pupils must show all possible progress. No estimate of the efficiency of a school system is complete if the case rests solely upon the results of tests. These results need supplementing in many ways, and one way is by a competent accounting of children.

B. R. B.

CALIFORNIA

The citizen of California may boast of climate and citrous fruit; and in so doing he is, no doubt, entitled to a hearing. To be sure he is a bit annoying, but this is rather because he exercises no restraint than because he hasn't a good case. But a far more legitimate source of state pride, though less often vaunted, is the public school system. Whether the Ayres index is right about it or not, the evidence is too consistent to be denied. To be sure, California still has some relics of unregenerate days which other states have disposed of. For example, she must still be listed as under the district system of local control. Moreover, she has at the top both a superintendent of public instruction and a state board of education. Even in these respects, however, the usual effects are largely mitigated. The districts, have been deprived of many of the powers that ordinarily make them a reactionary institution; while the state board and the state superintendent, because of fortunate personalities, get along together very much better than might easily be the case.

But with a few exceptions, which will doubtless be removed in the near future, the California system as a going-concern commands our all but unqualified respect.

There has just appeared a report of the special legislative committee on education, appointed by the California legislature of 1919. This report enters into the existing conditions in California and gives a glimpse of their historical development. It

then lays down what appear to the committee to be the lines along which the state should move in matters educational. The committee report is organized about four problems or questions, and to each of these a chapter is given. The first is the question of educational organization with particular reference to district and county units. The second is the problem of teacher training, both before and after teaching service begins. The third concerns the high school and junior college, and the fourth the cost of education.

The report mentions a number of hearings which the committee held, but it is impossible to distinguish the results of the hearings. Professor Cubberley wrote the report, and it is evident to all students of education that it strongly embodies his ideas. The committee is to be congratulated on its good sense in utilizing Professor Cubberley's ability. If one were censoriously inclined, one might ask why the committee held any hearings at all—in short, why it did not request Professor Cubberley to write the report at once.

To anyone who is interested in the development of schools, not only in California but elsewhere throughout the country, the passage of the sixteenth amendment to the California constitution is significant. This amendment was submitted to the voters last November and received their sanction. It adds kindergartens to the public school system and provides greatly enlarged state and county funds. The state is required to distribute to cities and districts an amount equal to thirty dollars per pupil in average daily attendance in the public elementary and secondary schools, *both day and evening*. The board of supervisors of each county is required to provide an equal amount for each pupil in average daily attendance in the public elementary schools and to provide twice as much money for each pupil in average daily attendance in the public secondary and technical schools. The legislature is also required to provide for the levying of local district taxes for public school purposes. Thus, from state and county sources combined a minimum of sixty dollars per elementary school pupil (day and evening) and a minimum of ninety dollars per secondary school pupil (day and evening) is provided. These amounts are in excess of the average per capita cost of elementary and high-school instruction even in progressive communities. Since a district tax is definitely required, the added amount for educa-

tional purposes is sufficient to place the schools of California in an enviable position.

One datum on this point may be of interest. The school people of Illinois are asking the legislature this year for an increase in the state distributable fund. This fund now amounts to six million dollars—a beggarly amount for the second state in the Union in wealth. Dr. Carter Alexander lately brought this out in an address in which he showed that if Illinois made the same effort that California was making *prior* to the adoption of the sixteenth amendment it would have a state distributable fund of twenty-three million dollars. But California has not been content with her former effort. She has, by referendum vote of the people, provided a state distributable fund—to say nothing of the even larger county fund—which is 75 percent higher than the former fund. To equal this Illinois would have to provide a fund of forty million dollars—or twice the amount which after much hesitation and many misgivings the Illinois school people have ventured to request. California got her increase from the people directly. We wonder if the people are not more interested in education and more willing to make sacrifices for it than most members of state legislatures are aware. We wonder in other words whether the schools may not stand a better chance of favorable treatment at the hands of the people than at the hands of their representatives. In any event recent events in California should be brought to the attention of state legislatures and the “deadly parallel” should be drawn. California not only provides handsomely for her schools but she serves magnificently the cause of education everywhere.

B. R. B.

Reviews and Abstracts

E. H. CAMERON, *Editor*

LEARNED, WILLIAM S., BAGLEY, WILLIAM C., and McMURRY, CHARLES A., STRAYER, GEORGE D., DEARBORN, WALTER F., KANDEL, ISAAC L., JOSSELYN, HOMER W. *The professional preparation of teachers for American public schools: A study based upon an examination of tax-supported normal schools in the state of Missouri.* New York City: The Carnegie Foundation for the Advancement of Teaching, 1920. 475 pp.

When this investigation was first projected, it was planned that it should consist of two parts: one was to give the results of an examination of all institutions in the state engaged in preparing teachers for public schools; the other was to deal with the teaching population. This volume is the second in a series of three bulletins dealing with the first part of the inquiry. The first bulletin attempted to answer the question: What is the best preparation for teaching? It consisted of a set of curriculums for the preparation of teachers. The present volume deals with the educational and administrative aspects of the preparation of teachers in state normal schools. The third will consider the work of colleges and universities in teacher preparation.

The material found in this volume is an exceedingly valuable contribution to the literature bearing upon teacher preparation, for it represents the conclusions drawn from definite facts ascertained by competent educational authority. Information was secured by thorough personal inspection and investigation on the ground by the members of the survey staff. In a word, this investigation represents a successful attempt to secure the facts concerning the educational side of the work of Missouri normal schools and methods and plans of organization and administration of these institutions, and to draw valid conclusions concerning the success of teacher preparation in Missouri which could be justified in the light of the data secured. The surveyors also make recommendations for future procedure which seem to the members of the staff to be justified in the light of the conditions existing in the state.

The bulletin covers a wide range of topics, all of which are of vital interest to students of normal-school organization and administration. The more important are: the origin and growth of normal schools in the United States and in Missouri; government and control of Missouri normal schools, with suggestions for a better organization of professional preparation for teachers, including reorganization of state educational control; function and scope of organization of normal schools; personnel of the Missouri normal schools; curriculums; the operation of normal schools with reference to the president and staff and to the administrative treatment of student body; the product of the normal schools.

The reader of this volume is impressed with the earnestness and sincerity of the survey staff, the courage with which they criticize that which is bad, and the vision of teacher preparation which they present.

On the other hand, the reader is equally surprised at some of the attitudes taken, especially that toward supervision. These investigators frown upon present methods and attitudes of supervisors of schools. Apparently these officers would become

superfluous in the kind of schools which will appear when teachers are properly trained. In such schools

the pupil would meet directly and constantly a well-selected and tested leader prepared to speak with personal effect and to win response by virtue of trained intelligence. Such leaders, instead of taking minute orders from higher officers, would themselves assume the responsibility, in joint action, for the conduct and development of instruction—the life-long business of capable minds. In other words, education would become a first-hand process by skilled practitioners, like any other professional service, instead of a second or third hand operation with its consequent perfunctory effects.

The writer of this review believes that this attitude toward supervision is unfortunate. It is doubtful if schools can ever be turned over to a body of teachers, however well trained, each of whom acts upon his own initiative, without effective and competent leadership and without efficient organization. The management of a school system cannot be compared with the private practice of law, medicine, or engineering. Nowhere has this form of conducting an enterprise like a public school system been found possible. The reviewer seriously questions whether this could be done in a system as complex as modern schools have become.

Another recommendation which seems to the survey staff capable of remedying many evils of the Missouri normal schools appear to the reviewer to be of very doubtful value. State normal schools as separate, individual institutions would be done away with and the normal-school system of the state would be organized under a single direct on as a part of an enlarged and reconstituted state university. The survey staff cannot seem to entertain the idea that the Missouri normal schools can succeed without being closely connected in some way with the state university. It seems inconceivable to this group of men that the state of Missouri can maintain five state teachers colleges under a central state board of regents with a competent educator-executive at the head of each institution and allow the state university also to maintain its existence with a competent head under its own board of regents. On the contrary, finding that the university, five state normal schools and a number of high schools with teacher-training classes are participating in the work of preparing teachers, they conclude that

There can be no reasonable question that better results than are now accomplished under these several managements could be secured under one control.

It is not clear to the reviewer that the state would act wisely by

incorporating the present normal schools together with the university school of education as a state Division of Education fully organized and equipped to provide for all phases of the professional training of teachers for the public schools of the state. The normal schools would thus become State Colleges of Education within the university and subject to the same consideration as any other branches of that institution.

That the state normal schools of Missouri should be unified under one board and become high grade state colleges is entirely clear. But why should they be "within the university"? The reviewer fails to see why a state like any of the great states of the central west cannot maintain half a dozen efficient state teachers colleges with genuinely collegiate standards and requirements, each a distinct institution, but all under a properly organized board. The problems, however, involved in organizing and conducting a great university are so complex and so different from those connected with organizing and administering a great system of state teachers colleges that two

separate and distinct boards are necessary and desirable. With an ever-changing personnel it is difficult enough for a group of executives such as state normal-school presidents, to familiarize a board with the needs of one group of institutions. It is usually several years before a new member of a board of normal-school regents becomes thoroughly familiar with the workings of these schools and arrives at an understanding of their needs. If there is added to this the necessity of becoming familiar with the requirements of a great university with all of its varied fields and activities, the task becomes nearly impossible. For these reasons, it would be an unwise policy of state educational administration to place state teachers colleges and the state university under one board.

Furthermore, it is not clear that a university college of education can or should participate to any great extent in the preparation of teachers for a state. This is the work of state normal schools. The college of education in the university has a different function.

Without doubt, each state should have an able and competent superintendent of public instruction who might be *ex officio* president of both the normal-school board and the university board. He should, at any rate, be the most influential member, the educational advisor, and the coordinator of these boards.

The reviewer seriously questions the wisdom of consolidating all the teacher-preparation agencies of the state under one direction, subject to a chancellor of the university who would be coordinate with the commissioner of elementary and secondary education. On the other hand, there is a good deal of experience which warrants the view that separate university and normal-school boards made up of intelligent public spirited citizens interested in education with the state superintendent of public instruction as the educational expert of each board, constitute a better form of state educational organization. Under this form the president of the state university and the president of each state teachers college would have equal rank and all would recognize the state superintendent as their superior officer. The reviewer emphatically dissents from the view that the great system of state teachers colleges such as that which Missouri should have can succeed only if made a part of the state university and controlled by the chancellor and by a board which is primarily a board of curators of the university proper, to which the decisions of the board of executives, consisting of the heads of the teachers colleges and the university dean of education, must be submitted for approval.

The authors of this bulletin make a strong plea for the teaching in normal schools of courses in the so-called academic subjects for both elementary and high-school teachers—courses which shall be of distinctly collegiate grade in quality and quantity. They hold that in such subjects as arithmetic, children's literature, algebra, and geometry it is possible to have a kind of course which will not be simply a review of previous elementary or secondary school work, nor the old time so-called professional review, nor purely academic work in the sense that this term is used in connection with courses in liberal arts colleges, but a new kind of course consisting of advanced work strictly of college grade with a professionalized type of subject-matter. The purpose of such courses would be to lay a broad foundation of scholarship and appreciation for prospective teachers, giving a new, a larger, and a different kind of insight, and a broader conception of subject-matter than the students previously had obtained.

In the judgment of the writer, this idea of a new type of subject-matter courses is one of the highly commendable features of this report. For example, in connection

with the process of long division in arithmetic, the survey staff believes that the prospective teacher

should understand the mathematical logic of the process; he should know how it evolved, and particularly the disadvantages of the more cumbersome processes that preceded it. He thus acquires a quite new view of something with which he already has, in his own judgment, a considerable measure of familiarity. His added knowledge may not include materials which, as a teacher of elementary arithmetic, he will pass on to his pupils, but it will deepen his appreciation of the importance of what he does pass on, and it will clarify his own understanding of the process itself.

In the lower grades,

even the primary teacher, struggling with the development of the simplest number concepts and processes, will find new insight and inspiration for her work in a knowledge of primitive number systems and of the steps that the race traversed in its development of the existing system of notation and numeration. If to these genetic studies one adds relevant excursions into the psychology of number, especially in connection with tests and scales, it is clear that a course of distinctly advanced character and quality is obtained.

The principle of specific preparation for specific types of teaching service receives due recognition in this report. Differentiated curriculums for primary, intermediate, grammar-grade, rural, and high-school teachers are recommended, as well as separate curriculums for teachers and supervisors of special subjects. This recommendation will receive support by normal-school teachers and administrators and by public school people in general, for it represents one of the leading tendencies of the day in normal-school organization.

There has been a tendency to discredit courses in psychology in normal schools especially in the first year. This has been due, not to the fact that psychology has no place in the preparation of teachers, but rather to the fact that the materials included in the courses in psychology have been very poorly chosen. The old-time course in general psychology dealt very largely with such topics as consciousness, association, perception, conception, judgment, reasoning, and volition. The material found in the traditional formal textbook on psychology was abstract, philosophical, metaphysical, and speculative to such a degree that its value for young teachers was very doubtful. This kind of psychology may well be thrown out of the normal-school curriculum, but in the judgment of the reviewer there is a type of material dealing with the mental processes of children in connection with the learning of elementary and high-school subjects which has great value. It is gratifying to find that the survey staff supports the view that the proper type of educational psychology—as well as other similar basic sciences—has a definite place. They

conclude, then, that the study of psychology in the teacher's curriculum has to fulfil two fairly distinct functions: (1) it must provide a basis for explaining and interpreting successful teaching practices as well as principles from which to derive new and better practices; and (2) it must furnish a working theory of the mental life as a basis for understanding the larger problems of education, many of which are only remotely connected with teaching. For the latter purpose psychology is only one of the several subjects of study, each of which should contribute its quota of principles, hypotheses, and points of view to a general theory of education. A substantial groundwork in biology is doubtless as important in this regard as psychology, while the claims of economics, sociology, and the history of education should not be overlooked.

The suggestions which the investigators make with reference to the organization of courses in psychology and other strictly educational subjects are thoroughly good

and constitute perhaps the best brief statement on these subjects now available. It may well be studied carefully by teachers of education in normal schools and colleges.

In the mind of the reviewer the discussion of practice teaching in this bulletin is one of the best features of the report. They find that in Missouri the training departments tend to be relatively weak as compared with other major departments in the normal schools. The survey staff deplors the fact that there are so few children available for training purposes and that there is no effective connection with local elementary and high schools. This is, however, one of the outstanding difficulties in nearly all normal schools throughout the country. The discussion of standards of practice facilities and the suggestions for organizing and administering practice teaching are thoroughly excellent. Many bad conditions were found in connection with training departments in Missouri, such as inadequacy of courses in observation and practice, the subordinate position of the training school, inferior housing, unsuitable hygienic conditions, unsatisfactory correlation of work of normal department and training department. In order to provide a solution for these difficulties the survey staff offers several excellent recommendations which normal-school administrators recognize as fundamental:

The training school must be under the direct control and supervision of an expert administrator fitted by experience and by specialized training for this type of work, and this director or superintendent must have under his immediate charge a corps of carefully selected and specifically trained critics or supervisors. The supervisory staff should include many, if not most, of the members of the so-called academic departments, and the entire group should form what might be termed a training-school 'cabinet.' This body should legislate upon all matters concerning the organization of the training school curriculum and questions of educational policy; the superintendent or director, as the officer in whom administrative responsibility is lodged, should have authority to make decisions upon all matters of administration, with the provision that any other member of the cabinet may appeal from his decisions to a higher administrative authority.

A plan of this sort would ensure (1) the administrative autonomy of the practice school under a single responsible head, and (2) the responsible cooperation of all academic departments and all members of the critic staff in the organization of the school, the construction of the curriculum, and the oversight of the student-teachers.

It is advisable, we believe, to combine the headship of the department of education and the directorship of the training department in one and the same person. The other members of the staff in education should also have definite responsibilities in the administration and supervision of the training school to the end that every class in educational theory may be in charge of a teacher who is in daily touch with the actual problems of teaching and management in an elementary or a secondary school.

The tendency on the part of normal schools to develop into local universities is deplored. The specific function of normal schools as agencies for training teachers is clearly and excellently set forth; and the tendency, now beginning to appear throughout the country on the part of normal schools to dissipate their energies and spend their funds in maintaining liberal arts colleges, is severely criticized. The survey staff sets forth its criticism here in vigorous language, maintaining that

it is difficult to justify the proposal of any school . . . to use its share of the all too scanty training funds to develop a local university. This means . . . to relegate its training of teachers to an inconspicuous department; to promote the other phases of collegiate work for their own sake and not alone as they produce better teachers; to fill classes, as college classes are now filled, with some

who will teach, some who will farm, some who will be politicians, and many who have no specific purpose; in other words, to sacrifice the enormous advantage of momentum and morale that inheres in a single fine idea well worked out, for a round of inevitable mediocrity. For the school has at best wholly insufficient funds for its present logical purpose—the preparation of a competent teacher for every position in its district. To take over other subjects, as these are conceived in modern education, is not only to fail in its proper task, but to fail altogether.

They claim further that:

a good normal school is a professional school throughout and can not be an arts college; if it wishes to conduct a college that is self-respecting, it must have double funds, separate classes, another faculty selected for that purpose, and so on. The combination is not a happy one in any place where it is now on trial, and the logic both of theory and experience is against it.

Everywhere throughout this volume higher standards of teaching and better work both in quantity and quality are strongly urged. Especially insistent is the recommendation that normal schools, or teachers colleges as they are now coming somewhat generally to be called, must be on the same plane of scholarship as the best universities and colleges. The fact is acknowledged that very many normal schools are already in this class, and it is gratifying to find this admission set forth in emphatic terms in connection with the equally emphatic demand that standards of normal-school instruction everywhere be raised to the highest collegiate level. The following statement will be accepted as thoroughly justifiable:

Longer to maintain the distinction between the university and the normal school as representing a distinguishable difference in grade or quality of instruction is, in the cases of the best normal schools in this country, purely factitious; and its eradication would be the best possible reason for requiring of inferior schools a genuine enforcement of the standards to which most of them now profess their adherence. In the numerous American normal schools now doing thoroughly standard work, the instructors have as broad and as intensive training as those giving instruction to students of equal advancement in good colleges and universities, and are quite frequently superior in this respect. In the content of instruction the normal school provides a specialized professional organization of material that in its field is as significant technically as any work in medicine or law. The teaching in first class normal schools is probably in advance of that to be found in ordinary arts colleges or even in the better medical and law schools.

Finally, it may be said in general that this document is a most inspiring piece of educational literature to anyone who is vitally interested in a better preparation for teachers. No other discussion of this topic contains so many suggestions for improving methods of teacher preparation or so fearlessly criticizes that which the authors believe to be wrong in conception, or faulty in execution. The criticisms are as inspiring as the vision of better preparation of teachers. The authors, as well as the Carnegie Foundation for the Advancement of Teaching, have rendered a great service in producing this volume.

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COURSALT, JESSE H. *The principles of education*. New York: Silver Burdett and Company, 1920. 468 pp.

The author aims "to present with logical cogency a simple and definite system of principles for guiding educational thought and practice." He has taken his task

seriously. He has read widely and with painstaking care a large amount of literature, has been associated with some of the leading educational theorists in America, and has had twelve years of classroom experience as teacher of the subject, supplemented by other work in the training of teachers. The culled fruit of this reading, association, and experience is gathered together in this volume.

The general point of view of the book places its author with those who (a) regard true education as a process of growth, and (b) propose to put education on a scientific basis. And while both ideas are rather narrowly conceived, so that many who would agree with the author as to the desirability of the proposed ends would find themselves in fundamental disagreement with him at important points, no one could study the book without arriving at deeper insight into the relation of educational theory to social life. The book represents a big view and sustained cogitation.

Professor Coursault's "Principles" is a most difficult book to estimate fairly, for this reason: it presents a living theory of education in the most deadly manner imaginable. A sermon by Jonathan Edwards is wildly exciting in comparison. The doctrine for which the author stands is expressive of the pioneer spirit in the contemporary educational world, but the whole cast of the book is medieval. The present reviewer agrees with the four teachers to whom he handed the book for a criticism of the chapters on their several fields of instruction. Without exception they spoke of having found interesting and enlightening suggestions in the chapters dealing with their subjects, and without exception they expressed their utmost sympathy for any students whose instructor should be misguided and inhuman enough to choose Professor Coursault's "Principles" as their textbook. This criticism does not mean to imply that college texts should be popular reading but simply that they should be a good deal more than lecture notes run through a printing press.

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University of Wisconsin

HUBERT, WILLIAM NUTT. *The supervision of instruction*. Boston: Houghton Mifflin Company, 1920. 270 pp.

The purpose of this book is not only to state and analyze the principles of supervision but also to give concrete devices and a technic for the administration of the principles.

The book is well organized and written in a very readable style. In the introduction the author states that there are two fundamental and distinct questions in the problem of training supervisors. (1) "What are the activities that supervisors in training schools and in public schools carry on in the performance of their duties?" (2) "What are the kinds of training that best prepare supervisors to perform these duties?"

In the first part of the book the author defines the work of the supervisor and analyzes it into eight distinct phases as follows:

1. He must lay the basis for effective cooperative teaching.
2. Select and organize the subject matter of courses of study.
3. Teach for purposes of demonstration and experimentation.
4. Direct systematic observation.
5. Direct the teaching activities of his teachers.
6. Check up progress made by pupils.
7. Measure the efficiency and progress of his teachers.
8. Measure the efficiency of his own supervising performances.

The second part of the book is devoted to a description of methods, devices, and technic for accomplishing the eight duties of the supervisor. Unlike most writers on supervision the author does not stop with general statements but gives details of method and numerous illustrations of devices and technic.

At the end of each chapter there is a brief summary and also a list of class exercises. Because of the wealth of concrete illustrations and suggestions the book is well adopted for classes in training schools. Superintendents and supervisory officers will also find it helpful and suggestive.

P. R. STEVENSON

University of Illinois

HUDELSON, EARL. *Hudelson English composition scale*. Yonkers-on-Hudson: World Book Company, 1921. 46 pp.

The Hudelson English Composition Scale differs from other available composition scales. It is printed in monograph form instead of on a single sheet. An entire page is given to each step of the scale. In addition to the scale itself the monograph contains the following sections: (1) purposes and use; (2) how to use the Hudelson Scale; (3) samples for practice in scoring.

The scale consists of sixteen compositions spaced at intervals of approximately 0.5 P. E. The values of the compositions were determined by the average rating given to them on the Nassau County Supplement to the Hillegas Scale by 96 teachers of composition who had been given two weeks intensive training in the scoring of compositions by this scale. Eleven of the 16 compositions were written by school children in the state educational survey of Virginia. Four compositions were taken from Thorndike's collection of 150 compositions arranged for use in psychological and educational experiments. One composition was chosen from the Thorndike Extension of the Hillegas Scale. The compositions written by the Virginia school children were on the topic "The most exciting ride I ever had." The scale is recommended for use with this topic. The grade standards for the scale were derived from those obtained from the Nassau County Supplement to the Hillegas Scale. The themes used as the basis of these standards were written on the topic "What I should like to do next Saturday." Mr. Hudelson states that he has found that when the same children write compositions on the two topics "The most exciting ride I ever had," and "What I should like to do next Saturday," the median scores of the themes, on the first topic are 0.78 of a step higher than when both are rated on the Nassau County Supplement. Thus in making the comparison with the norms it is necessary to subtract 0.78 from the scores. Thirty compositions whose values have been determined on the scale are given for practice and by means of this list a person may train himself to rate themes with a high degree of reliability.

From a practical point of view the fact that the scale is not printed on a single sheet of paper so that one may have all of it before him at one time seems to constitute a distinct handicap. It is possible that this handicap may be no more than one of inconvenience but it seems not at all unlikely that it might materially influence the ratings given to the compositions. The steps of the scale are about half that of the Nassau County Supplement and the Willing Composition Scale. This makes a more finely divided instrument. Unless the use of the scale shows that it is impossible for one person to rate compositions more accurately than one P. E. this feature of the scale should increase its usefulness.

W. S. M.

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Walter S. Monroe, University of Illinois, Urbana, Illinois.

The first number of the newly organized *Journal of the National Education Association* appeared under date of January, 1921. This journal, which is edited by

W. C. Bagley, supersedes the *Bulletin*. An Editorial Council is provided for which is to be primarily a legislative body charged with the responsibilities of determining editorial policies of the publication.

The first number is largely devoted to editorial announcements and propaganda relative to education legislation. The journal is distributed to all active members of the N. E. A. The announcement is made that the membership this year will exceed 100,000. A journal which reaches a large number of educators has an unusual opportunity as well as responsibility. It is to be hoped that appropriate recognition will be given to the field of research.

At the University of Wisconsin in connection with the training of teachers of Latin, a so-called Latin laboratory is in operation. Its purpose is to collect and organize as much material as possible which will be of use to teachers of secondary Latin. Lists, for example, of Latin plays and stories are available. A periodical leaflet, *Latin Notes*, is issued. Material for supplementary teaching in Latin is devised, collected, and distributed—material which gives meaning, not to say punch, to the teaching of Latin. The laboratory is under the direction of Professor Frances E. Sabin. The organization of this sort of a bureau or laboratory with reference to other subjects of the curriculum would add materially to the service work of state universities and state departments.

Dr. Lester M. Wilson, Professor of Psychology in the Eastern Illinois State Normal School, Charleston, sailed January twenty-sixth for Lima, Peru, where he has the position of Director of Studies and Examinations for the Republic of Peru, at an annual salary of \$7,200. Dr. Wilson will have charge of the certification of teachers, the making of curricula for elementary and secondary schools, and the standardizing of schools in the new five-year program that Peru is now putting into operation for the improvement of its school system. Dr. Wilson is one of thirty educators whose services have been secured by the Peruvian government. Dr. H. G. Lull, State Normal School, Emporia, Kansas, is to become head of the teacher training work.

Professor E. E. Jones, head of the Department of Education, Northwestern University, will sail late in May for Albania to assist in the reconstruction of their educational system. In addition to Professor Jones the Albanian government expects to secure the services of at least one other American educator who will assist them in their educational activities.

This step on the part of the governments of Peru and Albania confers an unusual compliment upon American education. It is not many years since America was drawing heavily upon certain European sources for its educational inspiration. It is very gratifying to find that we have now progressed to the point where other nations are looking to us for guidance in educational matters.

Information coming from Ohio during the past few months has indicated a keen interest in educational research on the part of school men of the state. A great deal of this has centered about the activities of Professor R. L. Morton, Ohio Educational Research Association. Professor Morton tells in a recent letter of the organization of the Ohio Educational Research Association. He points out the attempt to safeguard the organization so as to "insure a membership of active constructive workers." The methods employed are indicated in the following paragraphs which are quoted from his letter:

Applications for membership must first be approved by the executive committee and then accepted by a majority vote of those present at a regular meeting. The executive committee plans a thorough inquiry into the training and experience of each applicant particularly the applicant's training and experience in studying educational problems scientifically. Furthermore, at no time shall the total membership of the organization be permitted to exceed 100 persons. A scramble for the 37 empty berths has already begun and it is anticipated that there will soon be a waiting list.

One section of the article on membership reads as follows: 'Annually, on January first, the secretary-treasurer shall revise the membership list eliminating therefrom (a) those who have failed to maintain membership in the Ohio State Teachers Association; (b) those who have failed to pay their dues in this Department for the year just ended; and (c) those who have failed, in the judgment of the executive committee, to submit to the secretary-treasurer in the two-year period just ended, evidence of constructive activity in the field of educational research.'

In view of the fact that a number of similar organizations in other sections of the country have failed to maintain constructive activity, this attempt of the Ohio Educational Research Association will be watched with interest by many persons. If the association survives the decline of interest and enthusiasm which will inevitably come after the newness of the project wears off, it will have demonstrated the value of the plan of organizations.

The officers of the Association follow:

President: R. L. Morton, Director and Professor of Education, Extension Department, Ohio University, Athens.

Vice-President: A. R. Mead, Professor of Education, Ohio Wesleyan University, Delaware.

Secretary-Treasurer: F. J. Prout, Superintendent of Schools, Chillicothe, Ohio.

The Executive Committee consists of the president, the secretary-treasurer, and three other members, as follows:

Garry C. Myers, Head of Department of Psychology, Cleveland School of Education, Cleveland.

John R. Patterson, Superintendent of Schools, Bucyrus.

Can Students Estimate Their Own Intelligence?

In our classes in mental tests the question is frequently asked by the students whether it is very wholesome for children and students to be told the results of the

tests, or in any way to be made aware of their relative standing in intelligence. To this question the reply is invariably made that students and children usually know their relative standing in mentality anyway. Recently a situation has been created in our school which may throw some light on the extent to which this reply has any basis in fact.

At the opening of our first quarter this year, our school decided to permit such students as succeeded in making a score in the Army Alpha Test which was equivalent to that of the upper fourth of our college distribution to carry one hour in addition to the sixteen hours which are normally allowed, and to permit those who made a score equivalent to the upper eighth of the distribution to carry two hours extra. Under such conditions it is reasonable to suppose that those students who feel that they are unable to pass the test will not make the attempt. However, the situation is not free from disturbing factors. Most of the students did not know just what their relative standing among their classmates had to be in order to pass the test. Others were impelled to make an attempt in order that they might, if successful, be permitted to take the program which they had planned. It is not always an easy matter for students to make out a program of just sixteen hours which contains the courses they most desire to take. Still other students who were bright did not desire to carry extra hours and therefore did not come up for the test. In spite of these disturbing factors, I think our results are of some value.

Several years ago 265 of our students took the Army Alpha Test. Of these students 85 percent were in their first and second college years and the remainder in their third, fourth, and fifth years. From the results of these tests we obtained the upper quartile and the upper octile which are now used as standards for determining whether a student shall be permitted to carry only the normal 16 hours or one or two hours additional. The upper quartile is 141 and the upper octile 154. For the same results the median and the lower quartile are 122 and 104 respectively.

At the opening of the fall and winter quarters of the present year, a total of 46 students took the extra hour examination. For this group the first, second, and third quartiles are 130.6, 147.5, and 162.5 respectively. The median for this group, therefore, is three points higher than our standard quartile and the upper quartile for the group is eight points higher than our standard octile. To express the result in other terms, 41 percent of the extra hour group equaled or exceeded the upper octile and 61 percent equaled or exceeded the upper quartile of our standard distribution. The remaining 39 percent fell below the upper quartile but only 17 percent fell below the median of the standard distribution. If it be assumed that students who exceed the median of their group know that they are bright; and if the element of chance and the size of our group be left out of account, it may be said that 83 percent of our students knew that they were bright, or ranked above the average intelligence of our student body. This is true in spite of the fact that many of the students took the examination under the pressure of their desire to carry a program which appealed to them. If the factor of chance be allowed, 62 percent knew that they were bright.

It should be pointed out in this connection that of the extra hour group 25 percent were in the third, fourth, and fifth years. This is 10 percent more than were in the group upon which our standards are based. The students of our upper classes test distinctly higher than those of our lower classes. The median score of a group of 57 third, fourth and fifth year students is approximately 144. The higher percent of

upper class students is somewhat offset by the fact that 5 percent of the group belonged to our high-school group.

J. D. HEILMAN

Colorado State Teachers College, Greeley, Colorado

**Scale for Measuring Ability in Silent Reading, Picture Supplement Scale 1,
or PS-1**

The new scale for the measurement of ability in silent reading, Picture Supplement Scale 1, consists of a single sheet of paper, 12 inches wide and 19 inches long. The sheet is divided into five columns. Each column is divided into four sections, and in each of these sections there are a picture and a paragraph about the picture. The paragraph tells the child to make a mark or line with his pencil to supplement the meaning of the picture.

The instructions are extended through the paragraphs in such a way that they cannot be fully grasped unless the entire paragraph is read. They are so worded that they cannot be misunderstood in moderately careful reading; and can be correctly followed in only one way. There are no tricks or puzzles. The child who guesses is almost sure to make a mistake; but if he reads carefully his answering markings will be "right"; that is, they will be in accord with the instructions given him. The paragraphs are all of equal difficulty; and the child's score is the number of paragraphs which he can read and mark correctly in five minutes.

The new scale is designed to measure silent reading ability in grades three to eight inclusive by strictly utilitarian standards. The attempt has been to devise a test in which the child can readily succeed if he reads well enough to grasp the important thought in each section, and in which he cannot succeed at all unless he does comprehend each important thought. The scale measures the ability to read carefully; it measures, that is, the ability which is commonly necessary for the effective use of text and reference books.

Picture Supplement Scale 1 has four outstanding characteristics. The first is that it makes a definite attempt to measure a single ability, which is the ability to read silently a single type of material, at a constant level of difficulty, in a fixed period of time. It measures the amount of reading of a practically useful nature which the child can do in five minutes.

The second outstanding feature of the new scale is that, in its construction, extraneous, non-reading factors have been eliminated. A careful attempt has been made to discover the controlling factors which govern the child's performance in silent reading. Some 25 such elements have been identified. One, the child's rate of reading, has been adopted as the variable to be measured; and the remaining 24 factors have been, in so far as possible, held constant. It is believed that by following this method a test has been prepared in which every task presents the same type of reading difficulty as every other, and for which the scores represent comparative amounts of one single sort of reading ability.

The third outstanding feature is that the test is planned for classroom use. It can be given to large numbers of pupils simultaneously. It requires five minutes for actual testing; and can be scored accurately, rapidly, and easily, without the use of a key. The cost of printing has been kept extremely low.

The fourth outstanding feature is that, on the basis of results secured through extensive classroom experiments, grade scores have been turned into equivalent scale

values. This makes it possible, in testing with Picture Supplement Scale 1, to measure the ability of each child in terms of its relation to the known abilities of other children, who are approximately of the same degree of maturity, and have received approximately the same amounts of training.

Picture Supplement Scale 1 has been developed through a long series of experiments, in the course of which five other scales for measuring silent reading were devised, tried out, and laid aside. The monograph on "The Measurement of Silent Reading" which is now in press, describes these experiments in detail, and devotes several chapters to the discussion of the fundamental principles of measurement which were identified as basal to the work in silent reading. Special attention is given to the reasons which led to the adoption of the "scale for amount done," with quality and difficulty held constant, as differentiated from "scales for quality of product," or "scales for difficulty reached."

Since for practical work in the classroom it is clearly desirable to make available several alternate editions of a scale, so that children tested on one may later be again tested with new material of equal difficulty, and their progress noted; companion editions to Picture Supplement Scale 1 have been prepared, and will shortly be available. Picture Supplement Scales 2, 3, and 4 are of the same type and the same difficulty as Picture Supplement Scale 1. The four scales may be used interchangeably; and scores secured in one may be compared directly with scores secured in the other three.

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Meeting of the American Psychological Association

The recent meetings of the American Psychological Association, held at Chicago during the Christmas holidays, included a total of 57 papers, three addresses, and a symposium. Under the circumstances, the writer acquiesced to the request that he report the meetings, for the *JOURNAL OF EDUCATIONAL RESEARCH*, only after some hesitation. However, many of the papers dealt with subjects hardly of interest to readers of the *Journal*. In other instances there was a certain amount of duplication. So—the reader need not dread a catalog of the entire 57.

A preliminary classification of the entire series is, however, of some interest, in fact, of some importance as indicative of present trends in research. Thirteen papers, according to the writer's count, dealt with some phase of learning—the largest single group of papers. Twelve dealt with measures of ability or related matters. Five dealt with measures of emotional or other non-intellectual traits. Seven papers were of a theoretical nature, eight of the older type of experimental work; eight dealt with abnormal psychology, nine with animal psychology, eight had to do with psychology in business. Twenty related more or less explicitly, in one way or another, to educational investigation.

Comparison with previous programs brings out certain features of distinct interest.¹ Measures of emotional traits appear largely for the first time on such a program. The writer cannot but feel that the appearance of work along these lines is of very great significance. And the work comes largely from hard-headed investigators of

¹ It would be an interesting study to compare programs over a period of years, and so follow fads and fashions in psychological research! The programs of even four years ago look antiquated now.

personnel problems in big business. That these workers should find measures of general intelligence decidedly inadequate, in selecting good salesmen or executives, surely suggests the possibility that the present great emphasis upon the intellectual endowment of the child, as the all-important factor in the educational situation, may be one-sided and inadequate. And the vigorous efforts at measurement of these extra-intellectual traits in personnel work should stimulate analogous effort to measure temperament and character in school children. The writer ventures the prediction that five years from now tests of interest, emotion, moral trends, will be quite as informing as measure of intelligence. But now for the papers themselves.

It has been said that the importance of a paper might be measured by the amount of discussion it arouses. So evaluated, Professor Thurstone's was the all-important paper of the first session, in spite of the fact that it treated that threadbare topic "What Should be Taught in the Elementary Course?" (in psychology). For the average teacher who has dragged through the weary series of pedantries and banalities which make up the usual elementary course in psychology, Professor Thurstone's ideas should refresh and delight. He dares to imply that knowledge of the cold spots and the end-organ of Krause, theories of visual contrast, or introspection regarding the thought process, may not be so fundamental for an introduction to psychology as current practice might suggest. And he would prefer that the elementary course should treat more of characterology—would like some little reference to Freud, and discussion of mental hygiene. Surely it is such study of character traits, life motives, emotional trends, conflicts and compensations, that needs more consideration in educational psychology.

Other papers appearing in the session for general psychology dealt for the most part with topics hardly of interest to a school man. Similarly technical and hardly of interest to readers of the Journal were most of the papers dealing with learning. Six papers were concerned wholly or in part with the learning of mazes; such work is of great interest and importance in analyzing the fundamental factors involved in the learning process, but can hardly be reported here. A "Report on a Series of New Learning Tests" by Augusta F. Bronner of the Judge Baker Foundation, Boston, deserves mention, however, also do papers by Robinson (University of Chicago) on "Distribution of Effort in Memorizing and Its Effect upon Retention," and Edwards (University of Georgia) on "Methods of Study."

The papers dealing with problems in clinical psychology were not, perhaps, so numerous as might have been expected, in view of the great activity, at present, along these lines. G. W. A. Luckey (Lincoln, Nebraska) discussed "The Services of the Clinical Psychologist." He emphasized the importance of such adjustments as the clinical psychologist aims to bring about, and stressed the need for clinical study in the elementary schools and in juvenile courts. No child, he asserted, should pass through the elementary schools without receiving a mental and physical examination by the best of experts. Dr. Goddard, of the Ohio Bureau of Juvenile Research, emphasized the importance of qualitative as well as quantitative differences in ability. It is not sufficient merely to obtain an I. Q. or mental age on the Binet scale; an individual may be psychopathic or abnormal with an I. Q. of 100 or 140 as well as with an I. Q. of 75 or 50. Dr. Mateer, also of the Bureau, discussed "The Clinical Significance of the Kent-Rosanoff Association Tests." Such investigation of free association has been found valuable by the Bureau, in intensive study of atypical cases.

Wallin, of the Psycho-educational Clinic at St. Louis, presented a "Comparison of Three Methods for Making Initial Selection of Presumptive Mental Defectives,"

in the public schools. The three methods were (1) initiation of examinations left entirely with the individual schools; (2) selection, by the Psycho-educational Clinic from preliminary reports made by the elementary schools (the reports being compulsory for all schools) twice annually on a prepared form, of children judged to be most deficient mentally; and (3) selection of pupils making the lowest scores in a group intelligence test (Pressey Primer). The second method proved most satisfactory—although a correlation of 0.73 was found between group test and Binet.

Buford Johnson (Johns Hopkins) presented an interesting paper dealing with mental measurements of undernourished children. The total number of entrants to the first-grade classes of a public school in New York City were measured for selection of the undernourished. Out of the group of 126, 40 were found from 8 to 20 percent underweight, with an average of 11.6 percent. These were segregated into one class for study. A control group was formed of 41 boys nearest the normal standard, with an average percentage overweight of 0.83. The tests showed the nutrition group to average above the control group in intelligence. In the nutrition group those with the highest intelligence gain weight fastest. It is concluded that "other things being equal, especially the levels of intelligence, children from 8 to 20 percent under weight compare favorably with other children in mental traits."

Bridges (Ohio State University) presented data regarding the "Correlation between College Grades and the Army Alpha Intelligence Tests," as worked out from a total of nearly six thousand cases at Ohio State University. The correlations averaged 0.36. There were, however, large variations from college to college—the largest correlation, 0.54, appeared, curiously enough, in the college of agriculture, the lowest, 0.22, in the college of engineering. Marked variations from college to college were also found, in the comparative value of the tests. In conclusion it was stated that "these results seem to indicate that intelligence tests for university students should be selected and standardized for the different colleges separately, or that in addition to a general intelligence test for all students there should be specific tests for the students of the different colleges."

An important paper by Book (Indiana University) dealt with the "Intelligence of 6188 High School Seniors Going to College." It was found, in this state-wide survey, that about as many of the very dull as of the very bright high-school seniors plan to go to college. However, taking the groups as a whole those intending to go to college rank slightly higher than those who do not; those intending a liberal arts college rate slightly above those planning a technical education. Better integration between college and high school is urged. Two papers dealt with the relation of degree of Indian blood to intelligence (Hunter, University of Kansas, and Garth, University of Texas). In general, the more Indian blood the less score on the tests. Waugh (Berea College) gave comparative data regarding Oriental and American student intelligence. The differences were for the most part in favor of the American group. Mrs. Arlitt (Bryn Mawr) dealt with the influence of race and social status on the I. Q. A group of Italian children was found to average only slightly above a negro group, while a native white group stood out as clearly superior in intelligence. Also, children from homes of superior social status scored strikingly higher than children from poor homes. In fact, these differences due to social status were greater than those due to race. Miss Stecher (University of Iowa) showed, on the basis of repeated examinations, the comparative constancy of the I. Q. Porter (Clark University) pointed out certain uses of group tests of intelligence in college and industry.

Certain miscellaneous papers remain for brief mention. The tests for non-intellectual traits have already been referred to. Dr. Downey's work in particular is of great interest, but hardly permits of adequate description here. The important thing is that a definite beginning has been made, in measurement of temperament, interest, and emotional trends. Terman (Stanford) gave certain striking facts regarding a juvenile author, now barely nine, who composes either poetry or prose with astounding facility, by her eighth year had read 750 books, had the vocabulary of a university freshman. Her I. Q. is 188. She is two years advanced in physical development, has exceptionally good health, appears of normal temperament and emotional make-up. Last among these miscellaneous papers may be mentioned a brief presentation by the writer of an examination for investigating graduation standards, in departmental school. The examination consists of tests in reading vocabulary, grammar and punctuation, American history, and arithmetical reasoning.²

Following the annual dinner came the address of the president, S. I. Franz, which dealt with recent data showing the possibility of relearning, after injury to various portions of the cerebrum in which certain functions were supposed to be exclusively localized. Following this, reminiscences of Wundt were given by several of his former students. The address, the afternoon preceding, of the retiring vice-president of "Section I" (Dr. R. M. Yerkes) dealt with the need for more adequate psychological training of physicians. The symposium consisted quite largely of the usual protests against the uncritical character of present work with tests—protests which are deserved enough, goodness knows, but which would be more appreciated if they were accompanied by constructive efforts at improvement.³

At the annual business meeting thirty-five new members were voted into the association. There was an indeterminate discussion regarding the licensing of "consulting psychologists." The election of Professor Margaret F. Washburn, of Vassar College, as president for the next year, was announced.

It should be mentioned, in closing, that a number of members of the Psychological Association presented papers in the Section for Education of the American Association for the Advancement of Science—which has been reported in a previous issue of this Journal.

S. L. Pressey

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² Two other bits of work, of no practical interest to school men, nevertheless have sufficient intrinsic interest to be worth mention. Burt (Ohio State) reported results to show that falsification of evidence, in testifying before a jury, might frequently be detected by peculiarities in the record of the breathing of the witness. Finally, Hull (University of Wisconsin) told of a charming bit of experimentation in which, for study of the effects of smoking, he had his subjects smoke a pipe while blind-folded. He then occasionally substituted for the pipe a similar-drawing mouthpiece through which the subjects sucked simply moist hot air. And we are told that "confirmed smokers would puff the warm air with evident satisfaction, and even go serenely through the motions of blowing smoke-rings!"

³ The fundamental fact, of course, is that we lack in "pure research" with tests, because the older type of psychologist has not been willing to support such work.

JOURNAL *of* EDUCATIONAL RESEARCH

VOLUME III

APRIL, 1921

NUMBER 4

RECENT DEVELOPMENTS IN MEASURING HUMAN CAPACITIES¹

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This association requires its president to give an address. From the form of the resolution by which this custom was inaugurated it was obviously the original intent of the association that the address should be a review of educational progress in the calendar year preceding the annual meeting. That such a review can be comprehensive, detailed, and critical is of course impossible. Not only the volume of recent educational literature but its diversity of content and its range of method precludes the accomplishment of a purpose so elaborate. The allotted time requires a more restricted project. With your permission, I propose, therefore, to select a limited portion of the field which might legitimately be included in such a review and to confine myself to a discussion of recent events in the attempt to measure human capacities. I shall endeavor to indicate something of the progress made during the past year, to point out certain of the newer interests, and to evaluate our present status. If a single summary phrase were useful to indicate the drift of current discussion we might choose "the Inadequacy of Intelligence" as a suitable title for this paper.

Let us first give attention to the extension of intelligence examinations which has proceeded with acceleration during the year. The avidity with which the educational public has seized upon group intelligence examinations is both encouraging and alarming. It confirms our faith that such tests meet a real need in school work, but it also raises a doubt as to the existence of a wholesome critical attitude of mind toward the proper selecting of tests and the proper use of test results.

¹ Address of the retiring president of the National Association of Directors of Educational Research, delivered at the annual meeting of the association, at Atlantic City, N. J., March 3, 1921.

So widespread is the interest in the measurement of intelligence of young people in the schools that we may speak of it as a current educational movement. Students of education have devised the means—the tests, scales, and examinations—and practical educators are using them in the belief that a proper evaluation of the intelligence of pupils will make possible important remedial measures in teaching and school organization. It may be worth while briefly to examine the chief characteristics of this movement.

In the first place it is obvious that interest in the measurement of intelligence has been greatly stimulated by events connected with the great war. For a decade prior to that event there had been growing in the minds of students of education a conviction that the results of formal school education were greatly influenced by the native capacities of children. This conviction was largely due to the growth of intelligence tests and the revelations which such tests gave of the wide variabilities in mental capacity to be found among the school population. This background of belief was fertile soil upon which fell the spectacular examination of 1,700,000 soldiers by group intelligence examinations during the war. Educators were quick to see the possibilities of such tests as means of improving educational processes. Teachers, administrators, and supervisors, as well as students of psychology and education, have received the adaptations of the group intelligence examination to school uses with open arms and all too often with uncritical acceptance of what has been made available.

The eagerness of the educational public for these new scales and tests is evident from the number sold. When the first group scale was offered for commercial distribution the publishers accepted the offer as an adventure, printing a first lot of 10,000. Contrast this cautious move with the sales of the National Intelligence Tests first put on the market in September, 1920. More than 200,000 each of the first forms of scales A and B have already been distributed. This large sale occurs notwithstanding the rapidly increasing number of other scales offered in competition. It is probable that well-nigh 4,000,000 pupils in the public schools of the United States will have been examined by reliable group intelligence examinations by the end of the present academic year, less than 30 months after the publication of the first scale of this type.

A second fact to be noted is the range of individuals for whom standard group intelligence tests are now available. It appears that pupils of the intermediate and grammar grades are the ones most favored in this respect. There are at least a half dozen group examinations for these grades which give evidence of meeting in a fair manner essential statistical requirements. There are also a number of examinations for the primary grades and at least two for college students. For practically the whole range of formal education we have therefore dependable means of intelligence measurement with more than a dozen separate group examinations available. Not all of these examinations are the product of the past year. Some made their appearance in 1919; and the initial work on most of them dates beyond a year ago. But 1920 will be noted as the publication year of a large number. Of particular importance is the completion and initial publication of the National Intelligence Tests in two batteries of five tests each with ten forms for each test.

Again, it may be said that the quality of intelligence tests has enormously improved. Five years ago at a meeting of the American Psychological Association in Chicago a speaker argued that no intelligence test yet devised had shown a reasonable correlation with school achievement and it was further pointed out that the several proposed tests showed but small inter-correlations among themselves. There are numerous tests now offered for use to which these strictures do not apply. Inter-correlations ranging from 0.60 to 0.80 are now fairly common and some reach to 0.90, and more. Correlations with good measures of school achievement are sufficiently high to furnish a dependable basis for prognosis. Continued and extensive experimental study has made possible the construction of tests meeting the essential criteria of discriminative capacity, reliability, significance, and adequate standards of comparison.

No claim is here made that our present tests are finally satisfactory. Sufficient evidence may be adduced to show that they are not, and that in behalf of scientific accuracy we must go on improving these tests, reducing the sources of error and determining the specific uses to which particular tests are best adapted. The direction which experimental work should take is fairly clear; certain of the important methods are known and important improvements in tests may be predicted.

Doubtless one of the most encouraging facts about our present use of intelligence tests is the increasing tendency to utilize test results in modifying teaching methods, and in school organization and supervision. In many American cities pupils are being classified on the basis of scores made in these tests, special classes are being organized for subnormal and gifted children, courses of study are being revised, methods of instruction are being changed, and in numerous other ways the assault is being carried against the deadening lockstep and uniformity into which current public educational method has fallen. That all of these changes are wise or that all will lead to a better education is not assured. But the pragmatic method implicit in such remedial work will furnish a corrective to unwise exploitation of the new devices. The path of progress lies through just such remedial efforts, even though the immediate outcome may not be entirely successful.

The current year is further marked by the effort to state achievement in relation to intelligence. The recent advance in the measurement of intelligence has called in question the use of achievement tests and other measures of school progress. Obviously, the formal school program should not be held responsible for low achievement due to the inferior intelligence of pupils; neither should it be credited with high achievement due to superior intelligence. The wide ranges of intelligence found in classes and schools of the same designation show that the direct interpretation of achievement tests does just this thing. Such test results are only interpretable when considered in the light of intelligence test results from the same pupils. Franzen and Buckingham and Monroe have proposed methods for calculating an "achievement quotient" which will adequately credit the school for capitalizing and paying dividends on whatever intelligence investment it may have. This definite recognition of native intelligence as a determinative factor in achievement is significant not alone for the interpretation of achievement test results, but also because it calls in question all those experimental studies in the learning of school subjects where no cognizance has been taken of the intelligence factor. Such studies—and their number is great—must all be done over before any satisfactory conclusions can be derived as to the efficacy of the other factors involved.

The improvement and extensive use of intelligence tests should not, however, obscure their limitations. To any careful experimenter it is obvious that tests of the type currently listed as measures of intelligence do not give us all the information about children that we need. If we admit that the so-called intelligence tests are really measures of intelligence then it is apparent that success in school work and success in life are not determined by intelligence alone. Other factors play a part and in many cases a determinative part in success and failure.

Several years ago two students working under my direction studied the characteristics of fifty men who were admittedly successful men and of fifty other men who were obviously failures in life. Each of the hundred persons was rated on a scale of eleven points for each of eighteen qualities. When the data were combined for the fifty successful men the results showed clearly that in the combined opinions of all the judges the quality most apparently conducive to success was *industry* which in the scale was defined as "thorough, persistent, painstaking, enduring" and the opposite of "lazy, sluggish, indifferent, superficial." The nine traits ranking next in order were "efficiency, attentiveness, loyalty, prudence, honesty, adaptability, sympathy, tactfulness, and cheerfulness." Only four of these nine traits could by definition be construed as in any sense equivalent to the current concept of intelligence. The results showed that the judges regarded such non-intelligence traits as *industry*, loyalty, honesty, tactfulness, sympathy, and cheerfulness as weighing heavily in favor of success and such other non-intelligence traits as self-assertion, pride, conceit, jealousy, quarrelsomeness, suggestibility, and intolerance as weighting individual capacity in the direction of failure.

Similar data are accumulating regarding the capacities of pupils to do the work of the school. A few individual cases may clarify the point. For the past five years, the pupils in the high school of the University of Minnesota have been examined with intelligence tests and the subsequent work of the pupils has been carefully followed and tested. In general the pupils scoring highest in the tests make the highest school marks but certain notable exceptions to this general rule stand out. Naturally they are of two sorts: those in which pupils with high intelligence scores

make low marks and those in which pupils with low intelligence scores make high marks.

When John Smith entered the high school in the autumn of 1917 he stood third in a class of 60 pupils in a series of intelligence tests which included the following: opposites, analogies, hard directions, verb-object, Trabue completion, and Thorndike reading scale Alpha 2. He was later examined with the Army Examination A in which he scored 325 points placing him easily in the upper 10 percent of high-school freshmen and the equal of many college students. On the Otis scale he scored 179 points. During the four years in high school, however, only twice has this boy achieved a mark as high as C+ on a five-point scale of marks. Of 27 marks so far received twelve have been D (the lowest passing grade), one has been C-, and the others have been C. Not a teacher who has had this boy in class but believes him capable of much better work than he does; but not a single teacher has been able to induce him to do it.

In marked contrast to this boy is the case of Mary Jones, a member of the same class, whose army test score on Examination A was 231, who scored average on the initial tests (ranking 23 in the group of 60 entering pupils), and whose I. Q. (Terman) was 108. Only five times in her four years of high-school work has this girl scored so low as B in an academic subject. Twenty-eight times in thirty-three her marks have been A and she is generally recognized by her instructors as the best student in the class.

Cases like these could be cited at length. Edgar Brown of the present freshman class whose combined scores on the Miller high-school test, the Terman group intelligence examination, and the Haggerty intelligence examination Delta 2 placed him in the lowest fourth of a class of 55 pupils, achieved rank 27 in the first quarter's school marks. At the same time Ernest Stuart, who stood in the upper tenth percentile in the combined intelligence tests, nevertheless fell to thirty-sixth place in school marks.

One might infer from cases like these that the tests are inadequate to measure intelligence. It may be granted that the inadequacy of the tests is a source of error and that a better test would give a more accurate prognosis of success or failure. The probabilities, however, lie in another direction, namely that intelligence in itself is inadequate to produce success. It is not at all probable

that a perfect measure of intelligence would give a perfect correlation with school success or with success in later life. A more accurate measure of intelligence would only render the inadequacy of intelligence more apparent for the simple reason that success is not quantitatively coterminous with intelligence but with intelligence in combination with other significant human traits not subject to evaluation by tests of the type currently used as measures of intelligence.

Before proceeding to consider these non-intelligence traits let us enforce this idea of the inadequacy of intelligence by further illustration.

John Ralph reported at a large city elementary school in October, 1919. At the time he was on parole from the state reformatory. His history disclosed a long record of truancy, incorrigibility, and lawlessness. He had at various times attended eight different grade schools, two opportunity rooms for subnormal children, a detention home for delinquent boys and the state reformatory. He was admitted to the elementary school at this time on a special permit because he had been refused admittance at his home school on account of his record of incorrigibility.

At the time of entrance he was 15 years of age and was classified in the VIII^A grade. He was well developed physically, but his scholarship was of exceedingly low quality. He was placed in the department classes without warning to the teachers. At the end of the week the teachers appeared in a body in the principal's office, pronounced the boy to be subnormal, stated that he was unable to do any of the work assigned, and asked the principal to have him sent to a special school.

The principal investigated his case and discovered that while "he could not write a good paragraph, nor solve a problem correctly, he seemed possessed of a shrewd practical mind. When he was given a problem he seemed to be wholly unfamiliar with the regular method of procedure, but would frequently give the correct answer off-hand and then in his written work proceed to prove his result. His English from the standpoint of mechanics would have shamed an average fourth-grade child; but although his spelling, punctuation, and sentence structure were very poor, his oral work showed that he could think clearly and logically."

The boy was passed into a group of pupils to be examined by a psychologist who was unaware of his history or school achieve-

ment. On the Terman test the boy showed an I. Q. of 122 and was clearly above average in mental capacity.

Special courses were arranged to give him an opportunity to get the fundamentals of English and mathematics which he had never acquired. He stopped his cigarette smoking in response to the principal's appeal and the next day whipped the biggest boy in school who chided him for "turning good." He repaired and washed up the principal's automobile and was allowed to drive the car on errands for the school. He was given many other executive responsibilities and proved himself competent in many ways. He graduated at the end of the year and while he was not so well grounded as other members of his class, he had attained a measure of self-respect, confidence in his teachers, and a good working attitude toward the school. He finished the course with a record for good behavior.

That cases of this sort are more numerous than might at first be supposed is evidenced by the results of the intelligence examination of 94 pupils in a so-called "opportunity school" in a large city. These pupils had been assigned to the opportunity school because for one reason or another they did not fit the schools to which they by geographical location belonged. They ranged in chronological age from 12 to 17 years. They scored in the Otis Group Intelligence Scale from 21 to 130 points. Three of these pupils whose chronological age was 13 years scored 126, 128, and 130 points respectively, which places them in Otis's genius class; fifteen others were rated very superior, or superior, and 25 were rated as normal. Yet all of these 45 pupils were succeeding so poorly in their school work that they had been segregated into this special school. There is certainly doubt that defective intelligence was the cause of irregularity in any one of the 45 cases.

One of the most complete demonstrations of the inadequacy of intelligence is to be found in the Report of the Laboratory of Social Hygiene at the State Reformatory for Women at Bedford Hills, New York. The report is the result of six years of investigation into the character and history of women delinquents in New York State and its conclusions are based upon more than 500 case histories from six of the state institutions which receive delinquent women. The data which were collected and studied

under the supervision of Dr. Mabel Fernald, Director of the Laboratory of Social Hygiene, are interpreted to show that "the average woman prisoner in New York State falls somewhat below the average individual in society in mentality and in economic efficiency." The authors point out, however, that this lower average does not imply that delinquent women are all from the lower end of the scale of intelligence. "The range of the delinquent group was found to be practically coextensive with that of the army group, our most representative sampling of the general population" and the authors further hold that their "data fail absolutely to justify the view expressed recently by certain propagandists that delinquency and defective intelligence are practically synonymous and that solving the problem of mental deficiency will solve the problem of delinquency."

Current psychological literature multiplies this type of evidence as to the inadequacy of intelligence. Madsen in a careful study in the South Omaha High School showed that the boys made in each class higher intelligence scores but lower school marks than did the girls. Colvin finds not only moderate correlations between school marks and Otis intelligence scores but that 60 percent of all the failures in the freshman class of the Reading High School were made by pupils who scored normal or above. Branson reports that certain pupils of apparently superior ability (Otis) fail to take hold of the work as well as the rest of the section. Buckingham finds intelligence tests insufficient for purposes of classification. Dickson finds one-fourth of his accelerated eighth-grade group making marks below the average for the school. Pressey notes that "if we wish to foretell success in school, we must obtain a measure of school attitude," and Terman insists "that mental tests should be supplemented by ratings on character traits and by educational tests."

In noting the progressive use of intelligence examinations during the past year it should be pointed out, therefore, that there has also been a growing recognition of the limitations of intelligence examinations and even of intelligence itself as a basis for prognosis. At the same time there have been efforts to supplement the measurement of intelligence with estimates and measures of the non-intelligence factors contributing to success. The direction of such supplementation is twofold. There is first the effort to find tests for special aptitudes as a basis for predicting

success in particular occupational fields. Thurstone's studies in telegraphy, Kitson's studies of proof readers, Stenquist's tests for mechanical information are illustrations.

In how far such special aptitudes exist apart from the factors which make for general intelligence is an unsolved problem. Sufficient evidence is available to warrant experimental work even though such experimentation promises to be more intricate and difficult than was the measurement of intelligence.

Along with emphasis on the non-intellectual factors as significant for prognosis and apart from the experimental work on special aptitudes there has been some attempt during the year to analyze such factors and to indicate the means for their evaluation. The most tried method for such evaluation is the so-called "rating scale" requiring personal judgments of non-measurable human qualities. For the initiation of this method as an instrument of psychological and educational research we are doubtless indebted to Cattell who used it not only in laboratory experiments but in his important work in evaluating the individual worth of American men of science. During the year Dr. Cattell has made an important addition to his method by developing "the probable error of a vote" taken in connection with the new forthcoming edition of this valuable work. The most ambitious effort to apply this method of estimating human qualities was the Scott rating scale for army officers used by the War Department during the recent war. The application of the method to educational work is not new but the year has seen numerous efforts to apply the rating method to the evaluation of capacities of pupils and to the qualities of teachers. The Detroit scale for rating teachers and the Pressey card for the rating of pupils make use of the Scott method.

By this method the judge makes up a separate rating scale for each quality to be considered. For the highest unit on the scale the judge chooses from among his acquaintances the person who in his opinion possessed that quality in the maximum amount. Similarly for the lowest unit on the scale a person with least amount of the quality is chosen. The midpoint on the scale is located by selecting a person who in the opinion of the judge stands midway between the highest and lowest units already chosen. Other points may be interpolated in any number between the ones thus fixed. By this means the judge constructs a rating

scale whose units are human individuals who are the personal acquaintances of the judge himself. Seemingly this device renders more concrete the estimation of human qualities and Scott has shown that in the rating of army officers the probable error in judgment is reduced by the use of this type of scale. Pressey reports "a coefficient of reliability (of agreement?) of 40" for different teachers' estimates of quality of "school attitude," but higher coefficients in the case of other traits.

Smith has published a scale for the rating of pupils which in his opinion has considerable validity and usefulness.

Kent criticizes previous teacher-rating schemes because they place so little emphasis upon the results which teachers achieve in the schools and recommends a rating scale in which the achievement of pupils may count for as much as 75 points in a total of 155 points which a perfect "professional" worker might achieve. Connor, who like Kent, proposes a teacher-rating scheme evolved out of the necessity of a school superintendent's supervisory and administrative duties, writes that "the means at hand for making scientific observations of the progress of pupils are scanty" but he believes such pupil-progress to be an important element in the rating of teachers.

In the Virginia survey I myself used a rating sheet upon which the teachers were asked to estimate the scholarship, intelligence, and industry of their pupils, using a five-point scale for each quality. A study of the results indicate generalizations somewhat as follows:

(a) Teachers using the same directions differ greatly in their ability to rate the intelligence of their pupils. (b) In general they make little distinction between intelligence and scholarship. (c) The judgment of the intelligence of a child is influenced by the school group in which he is found. Because of this an older pupil is usually rated above his intelligence and a younger pupil is rated below his capacity. In other words, teachers rate poor pupils better than they are and superior pupils as inferior to their real capacities. (d) A group intelligence test is a more generally dependable instrument for evaluating the intelligence of a pupil than is the teacher's judgment.

A consideration of all these rating devices leaves one with the sense of a problem discovered but unsolved. The variety and multiplicity of names used to designate traits to be rated

is bewildering. Some of these names are apparently intended to indicate psychological traits, others may be classed as social, others educational, and still others relate to the effect which an individual is able to produce on things or upon other persons.

Thorndike and Knight have shown by a study based on the use of the Scott army scale and the Boyce scale for rating teachers that there is a "constant error" in the use of rating scales due to the influence of "a marked tendency to think of the person in general," a tendency which suffuses ratings of special traits with a kind of halo. "The magnitude of this constant error of the halo seems surprisingly large," so large that the authors question the value of the ordinary type of rating scale for special qualities.

It would seem necessary to proceed by the method of experimental analysis to determine the group of traits important for rating and to determine the logical basis upon which correct rating scales can be based. It is further necessary to evolve by statistical methods the types of units and the number of such units for a usable scale, and finally the directions for the use of such scales must be definitely standardized.

While unhappy chaos marks the present use of rating scales, a glimmer of hope comes from another source. During the year Dr. June Downey has published additional results from her "scale for the measurement of the volitional pattern." This scale comprises objective tests, 12 in all, designed to measure such personal qualities as assurance, flexibility, speed of movement, motor impulsion, resistance, tenacity, coordination of impulses, freedom from inertia, motor inhibitions, care for detail, speed of decision, etc. The tests were first designed for individual examination but are being adapted to group use. The objective scores are platted in graphic form and the resulting graph is called "a will-profile." The author proposes these tests as a supplement to intelligence examination. She claims that "the will-profile has considerable general characterological significance and that it can be used to advantage not only in getting the general temperamental pattern of an individual but also in determining the specific combination of traits," and that in conjunction with intelligence tests it "affords in many situations a basis for conservative prophecy." In the author's three papers during the year she sets forth the results of the tests with varying groups and details a number of case studies. The

method has been used in the psychological laboratories of Cornell, Chicago, Carnegie Institute of Technology, and the University of Minnesota. It may develop important results in the measurement of character; but its chief claim to merit so far is that it initiates objective method in a field where our chief reliance hitherto has been upon subjective opinion.

These, then, appear to be the accomplishments of the year in the field of mental measurement: the extension of intelligence examinations in the public schools, the further development of rating scales for teachers and pupils, and the beginnings of objective measurement in the realm of non-intellectual traits. Certainly no other year, except that momentous first year of the great war, has witnessed more activity in this field. We are probably right in believing it to be a year of progress.

THE EFFECT OF CLEAR OBJECTIVES ON THE TEACHING OF READING

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In the primary grades reading is a vital subject. Teachers plan their work with exceeding care; minute matters are considered and given proper place; system is evidenced in every project; advice and information are keenly sought; every objective is clearly in mind and every road carefully charted. Pupils on the other hand feel the urge to success; they employ strict attention and endeavor; failure to succeed is serious, and success brings real satisfaction. In the upper grades, however, carelessness reigns; objectives are indistinct; paths of progress are unexplored; study of method is neglected. Imagination, concentration, judgment, and the memory are not stretched, although no other subject offers more opportunity for their development.

Thus the question arises, what motives can be supplied that will bring to the upper grades the vigorous mental efforts of the lower grades. First, the abilities in reading that are needed for further school work and for out-of-school activities must be more clearly determined. Second, definite measures of accomplishment, failure to meet which will bring shame, must be established. Third, more careful attention to method, materials, and to individual needs must be given.

The first of these needs is fairly met by the "Attainments in Reading" chart,¹ composed of material submitted by the teachers and compiled for the Rochester schools by Miss E. H. MacLachlan and a committee of teachers directed by Miss Mabel E. Simpson and Mr. J. P. O'Hern. Here we have, if they can be generally accepted, concrete, definite suggestions concerning what we should be attempting in the elementary grades. Thorough knowledge of this chart would indicate general appreciation of the difficulty involved in the satisfactory teaching of reading. In the light of it upper-grade reading cannot continue to be considered the easiest subject to teach. It challenges effort, preparation, persistence; and in these it is a brief as well as a decidedly welcome guide. Its use should bring emphasis and variety to the work and

¹O'Hern, Joseph P. "The development of a chart for attainments in reading," *Journal of Educational Research*, 3:180-94, March, 1921.

should secure the attention of the pupils to achievement. An interest in the growth of ability to do the things demanded by the chart may thus be added to the mere interest in stories read.

Concerning the need for more definite standards; it is now possible for us to measure with a fair degree of accuracy the ability to read orally, the rate of silent and of oral reading, the ability to read short paragraphs and to react immediately under instruction and the ability to reproduce and to answer questions concerning long paragraphs. These abilities and others not here mentioned may likewise be determined by the use of informal tests. But, merely the ability to measure achievement in reading will not stimulate; the single giving of a standard test will not necessarily promote progress. Constant checking up of results for the purpose of charting progress so that pupils and teachers are aware of their needs is essential. By the use of constant checking the optimum achievement in reading may be established and this optimum will be demanded and obtained.

Concerning the need of more careful attention to method in the upper grades the general trend of effort may be accepted.

The meaning of the foregoing suggestions is explained and illustrated by the following description of an experiment attempted at the Francis Parker School during the fall of 1919.

In the spring of 1919 the Monroe, Courtis, and Gray reading tests were given to all our pupils. These tests showed that our pupils were satisfactory oral readers, that the rate of reading was about normal, but that there was a decided limitation in the pupil's ability to reproduce definitely and to answer questions correctly after reading. The fifth and sixth grades were shown to be relatively the poorest readers in these respects. So we decided to see what could be done to remedy the situation. We had three sixth grades in which were 109 pupils. We decided to concentrate our efforts for the entire term on securing progress in the quality of silent reading. We were influenced to this action not alone because our weakness was just here but also from a conviction that ability to reproduce underlies all success of the pupils in their future school work. Moreover, we believed that the ability to reproduce an article with something of its spirit, its logic and its idioms, cannot but be a valuable social and professional attainment. Argument often depends upon power to quote accurately from the thoughts of others. Reproduction requires

strict concentration and tenacious memory—two attributes necessary in all mental effort. So in thus restricting our teaching we were not unconscious of the other needs of reading but were merely expressing our confidence that the quality of silent reading was important.

Our sixth grades were departmentalized in arithmetic, geography, and English. We substituted reading for English and the pupils thus had forty minutes for reading each day.

Our first problem was to determine why pupils had failed in reproduction. Aside from any lack of strength which may have been present in the teaching we concluded that one factor was our general policy of discouraging the use of the words of the text and of constantly urging of pupils to "tell it in your own words." We cannot enter into much discussion of this point. We decided, however, that whenever an effective word used in the text could be remembered it should be used and that attempts should be made to remember some of the more expressive ones. In addition we tried to discourage the almost universal desire of pupils to bring into reproduction statements that did not appear in the text. Grade charts showing each pupil's records were shown and explained to the pupils and we did what we could to encourage them to improve. Daily reading for accurate reproduction, required for a variety of purposes, was practiced. Each week an informal

TABLE I. TWENTY WEEKS' PROGRESS OF 109 SIXTH-GRADE PUPILS
AS SHOWN BY THE USE OF THE GRAY READING TESTS

	ORAL READING	SILENT READING			
		Rate (Seconds per 100 words)	Quality		
			Questions	Repro- duction	Average
First test	48	42	40	20	30
Second test	53	40.9	59	27	43
Percents of gain	10	2.5	47.5	35	43
Fifth-grade standards	48	38.9			32
Sixth-grade standards	49	35.8			39

test was given which demanded the same activities as the Gray tests. These tests were printed, and copies handed to each pupil.

At the end of twenty weeks the pupils were retested by the Gray tests. About half of the pupils were fifth-grade pupils at the time of the first test. All were *VIB* and *VIA* pupils at the time of the second test. Scores were computed for those pupils only who were members of the school at the time both tests were given. (Only ten of the 109 pupils received a lower score in quality on the second test than on the first. Three made the same score on each test.) A summary of results is given in Table I. These results indicate that while the pupils were increasing their quality of reading 43 percent under intensive training for that purpose, the sole purpose of improving quality, they incidentally improved in oral reading five times as much as they normally would and at the same time made some improvement in rate.

The problem of attention to individual needs which we have mentioned as necessary for satisfactory teaching was met as follows: Twenty-one of the poorest readers among the 109 pupils in these sixth grades were selected from their records on the first Gray tests. They were then divided into four groups and arrangements were made to give each group about thirty minutes' special help in reading three or four times a week.

Our first concern with these pupils was to find out why they were unable to read. We concluded that poor reading might be due to any of the following causes: (1) physical defects; (2) lack of knowledge of English; (3) poor teaching and neglect; (4) lack of general intelligence; (5) special disabilities in reading. Examinations of the pupils showed certain physical defects in some cases but in only one case could these account for the difficulties in reading. Only one pupil was handicapped because of lack of knowledge of English.

We attempted to diagnose each case to find wherein each pupil was troubled. Let us digress here to remark that diagnosing the defects in reading is simple compared with the task of determining the cause of those defects. A doctor may take the pulse, measure the temperature and blood pressure, and pronounce his patient ill with a certain disease; but it may take long study to find out the cause of the disease. The symptoms of poliomyelitis and of cancer are easy to discover but the cause still defies detection. It is important, however, to observe that though the cause of the disease may not be known, relief or even cure may

often be effected. So in reading, inability to point out the cause of failure need not prevent us from applying measures of relief.

We had each of the twenty-one pupils of whom we have been speaking tested by the Stanford Revision of the Binet-Simon Test. We also gave them the Otis Group Intelligence Scale. These tests were applied in order to see to what extent low mentality might be a cause of trouble. Our reading tests and our judgment led us to suspect that this might be a cause in some cases. Yet low mentality was by no means a sufficient general cause. Table II shows that ten of the twenty-one pupils (all of whom were poor readers) had intelligence quotients greater than 100. Only six of them fell below 90, the lower limit of normality. Two of these were pupil No. 4 and pupil No. 17 (Table II). Yet these children made substantial progress in the interval between the tests. If their rather low I. Q.'s were taken as a full explanation of their poor scores in the first test, it would be difficult to explain how they could make such progress after the test.

To illustrate the attempts to study individuals we give the following description of three of the cases entered in Table II:

Case 13.—A girl whose age was 14-9; has a mental age of 11-1 and is therefore over three and one-half years retarded; born in Holland; lived in America four years; never learned to speak well; does not understand instructions easily; is not alert; has poor eyes and wears glasses. The doctor suggested that she be relieved from the regular gymnastic exercises because of physical difficulties. The girl has a sister in the school whose foreign birth could not be guessed and who does everything well. Teachers feel that her health and lack of mentality together with her lack of English are responsible for her poor reading.

Case 16.—A boy whose age was 11-1; has a mental age of 12 years; has no physical defects; has a fine home and unusually intelligent parents; does arithmetic well and succeeds in other subjects; no apparent cause for poor reading; reported that he knew he could never read and that he did not like to try; his father had tried to help him but without success; nevertheless he did well on the test. Asked at the end of the term how he could make so much progress, he reported that it was because of the general interest of the grade in reading and because his teacher helped him specially. He said that he had read his first book at home, the *Swiss Family Robinson*, that he liked it and that he was then reading a boy-scout book.

TABLE II. THE RECORD OF TWENTY-ONE POOR READERS BEFORE AND AFTER TWENTY WEEKS OF INDIVIDUAL ATTENTION

PUPIL No.	SEX	GRADE ^a	AGE AT BEGINNING OF PERIOD (YEARS LAST BIRTHDAY)	MENTAL AGE OF PERIOD (BINET)	INTELLIGENCE QUOTIENT	OTIS SCALE SCORE	RATE ^b (SECONDS PER 100 WORDS)		QUALITY ^c (AVERAGE OF REPRODUCTION AND QUESTIONS)		SCORE IN ORAL READING ^d	
							First Test	Second Test	First Test	Second Test	First Test	Second Test
1	G	VA	11	10.8	91	41	56	86	0	14	23	31
2	G	VA	11	11.2	.98	64	27	32	6	29	56	55
3	B	VA	10	12.2	.112	55	47	40	7	16	40	50
4	G	VIA	12	10.9	.88	65	39	48	7	51	49	56
5	B	VIB	13	12.4	.88	49	184	196	9	44	4	24
6	B	VA	10	13.8	124	60	43	37	9	47	54	56
7	G	VIB	11	15.4	128	71	26	35	9	35	40	44
8	G	VA	11	11.3	.96	43	39	37	12	27	45	51
9	G	VIB	10	11.8	.105	52	120	49	14	25	40	53
10	G	VIB	13	10.4	.75	57	78	50	14	18	35	44
11	G	VIB	12	10.8	.84	43	65	47	14	19	21	34
12	B	VIB	11	13.3	.107	74	51	43	14	48	56	66
13	G	VIA	14	11.1	.75	57	48	55	14	13	34	49
14	B	VA	12	13.7	.111	81	28	27	14	21	50	51
15	G	VIB	12	12.8	.98	74	59	36	16	27	36	40
16	B	VA	11	12	.108	47	74	67	19	45	35	44
17	B	VA	12	10.8	.83	71	40	37	19	36	35	43
18	G	VIB	11	12.8	.110	69	60	53	20	36	49	55
19	B	VA	10	11.5	.103	64	28	29	22	38	51	53
20	B	VIB	11	14.8	124	91	40	37	23	48	36	44
21	B	VA	13	12.7	.93	58	114	76	41	51	34	40
Averages.....							60	53	14	33	39	47

^a All pupils were promoted one half-yearly grade during the twenty-week period except No. 11 and No. 13. These two pupils were left back.^b Fifth-grade standard, 36; sixth-grade standard, 35. ^c Fifth-grade standard, 32; sixth-grade standard, 39. ^d Fifth-grade standard, 46; sixth-grade standard, 49.

Case 5.—A boy whose age was 14-1; has a mental age of 12-4 years; read with difficulty the simplest words; has very nearly been abandoned in so far as hope of teaching him to read is concerned; was interested in the records of the grade; very much wished to improve; for three years he had had difficulty in seeing, which had not been discovered; could do arithmetic if some one would read the problems but could not solve a single problem if compelled to read it for himself; his low mentality had evidently given him a poor start and his difficulties had increased from grade to grade. It seems that he is also the one out of the 109 pupils who has some special disability in reading. What the difficulty is we do not know. It evidently has to do with the rate of comprehension. At the end of the term he said that he had read a complete book, that he liked it and that he was beginning to read rapidly enough to enjoy the story. He added, "My parents are surprised to hear me read from the newspaper."

The details of the devices used for improvement cannot be given here. The teachers employed word drills, sandtables, progress charts, home reading of assignments with written reproductions and weekly tests. The pupils made joke-books, asked questions, read for visitors, dramatized and discussed their own achievements. Emphasis and variety were the watchwords. The error in attempting to judge reading merely by hearing pupils read can be judged by this study.

In previous years our efforts had been expended largely upon oral reading without attaining a high degree of success. When the emphasis was shifted to silent reading for meanings, the oral work improved decidedly.

One conclusion to be drawn is that the excuse of pupils being "poor material" is a poor one. A second conclusion is that if pupils have definitely established standards toward which to work, pride will enter in and the work will improve. On the other hand, while mental and physical defects are to some extent the cause of poor reading ability, nevertheless, standards, frequent testing, and special help from the teacher will result in better reading in spite of these defects. Still another conclusion, and perhaps the most important, is that an effort to improve the quality of reading in a grade will result in a general improvement in oral-reading attainment and ability to reproduce.

AN EXPERIMENT WITH THE OTIS GROUP INTELLIGENCE SCALE IN THE NEEDHAM, MASSACHUSETTS, HIGH SCHOOL

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Group intelligence tests are being used for various purposes: to divide a school or class into divisions according to ability, to aid in guiding a pupil in his selection of courses, to give teachers information concerning pupils, and so on. One object in the experiment described here was to see if these tests could be used to stimulate pupils capable of doing good work to live up to their capabilities. It was felt that this would be a very practical benefit and that if the tests could be used for this purpose they would be of constant value in improving the standard of work of many pupils.

On December 29, 1919, the Otis Intelligence Scale (Form A) was given to 173 high-school pupils divided as follows: grade XII, 26 pupils; grade XI, 27 pupils; grade X, 46 pupils; grade IX, 74 pupils.

In order that the test might be given simultaneously, the whole school was divided into five sections. These sections were given the test by the superintendent of schools, the high-school principal, and three teachers. The test had first been given to the teachers by the superintendent; and the procedure and methods had been discussed so that conditions might be as nearly uniform as possible.

Medians and ranges in the Otis Group Intelligence scores (Form A) are indicated in Table I.

TABLE I. RESULTS OF OTIS GROUP INTELLIGENCE SCORES, FORM A

Grade	Median	Range
XII	164	209 to 90
XI	159	183 to 104
X	143	205 to 61
IX	129	191 to 70

In order to secure an accurate record and to make some comparisons, Form B was given on January 16 with the medians and ranges as indicated in Table II.

TABLE II. RESULTS OF OTIS GROUP INTELLIGENCE SCORES, FORM B

Grade	Median	Range
XII	182	206 to 109
XI	175	191 to 121
X	160	210 to 80
IX	151	200 to 82

The records for Form B are distinctly higher than those for Form A, due probably to the familiarity with procedure acquired in the first test. The average difference between the medians of Forms A and B is 18 points. The relative positions of the pupils were, however, about the same in the two tests as shown by the correlations between Form A and Form B in Table III.

TABLE III. CORRELATIONS BETWEEN FORM A AND FORM B

Grade	Correlation Coefficients
XII	0.92
XI	0.89
X	0.95
IX	0.91

These high correlations indicate that the two forms test the same things.

Another set of figures (shown in Table IV) was made up to compare the records of pupils of various ages in the different grades.

Table IV shows clearly that the youngest pupils in the grade made the best records. With one or two exceptions (where only one pupil is in a group) the scores decrease as the age increases. Upon examination of the scores of pupils of the same age in different grades it is found that the highest scores in each case are found in the highest grades. For instance, the sixteen-year-old pupils in grade XII score 168, while those who are 16 in grade XI score 152, in grade X, 139, and in grade IX, 115. These results indi-

TABLE IV. COMPARISON OF RECORDS AND AGES IN GRADES XII-IX, FORM A, OTIS SCALE

Age	GRADE							
	XII		XI		X		IX	
	Number	Average Score	Number	Average Score	Number	Average Score	Number	Average Score
13	.....	.....	.....	.....	.....	.....	8	137
14	.....	.....	.....	.....	1	140	27	135
15	.....	.....	2	174	13	155	26	118
16	3	168	9	152	20	139	10	115
17	12	168	14	151	10	125	3	113
18	8	156	1	145	2	120	.....	.....
19	2	127	1	104	.....	.....	.....	.....
20	1	135	.....	.....	.....	.....	.....	.....

cate that the pupils of high intelligence have been able to complete the elementary school in less time than those of lesser intellectual capacity. The retardation of the older pupils is evidently accompanied by a certain lack of intelligence.

The next problem considered was the correlation between the intelligence tests and the teachers' marks. For this purpose the marks given during the fall term (two periods of eight weeks each) were considered. When the average of the Otis scores (Form A and Form B) and the marks were related, the correlation coefficients were found to be as follows: grade XII, 0.66; grade XI, 0.59; grade X, 0.55; grade IX, 0.58.

These correlations are fairly high and show a marked tendency for the distribution of teachers' marks to arrange themselves according to intelligence as shown by the tests.

We then prepared diagrams which showed how each pupil ranked in relation to the other members of his class both in the intelligence test and in his marks. Naturally some pupils were higher in marks than in intelligence and some lower. We felt that we did not need to worry about the pupils whose work graded higher than their intelligence. The most outstanding cases of this kind were discussed to see if the teachers were giving too high marks. In each case the superior rating in school work was interpreted as being due to hard, conscientious application on the part of the pupil.

TABLE V. RELATIVE RANKING OF TWENTY-TWO SELECTED PUPILS IN THE INTELLIGENCE TEST AND IN MARKS

GRADE	PUPIL NUMBER	OTIS RANK IN CLASS	MARK RANK IN CLASS	REASON FOR DIFFERENCE
XII	1	2	13	Outside work
	2	5	17	Slowness
	3	17	24	Absence due to social activities
XI	4	3	14	Outside interests and lack of study
	5	5	20	Diffidence and lack of knowledge of how to study
X	6	4	18	Lack of study
	7	5	30	Absence due to home conditions
	8	17	37	Uninterested, perhaps due to poor health
	9	10	22	Too interested in social activities
	10	18	31	Absence due to social activities
	11	21	35	Absence due to home conditions
IX	12	1	15	Lack of ambition and application
	13	4	29	Doesn't know how to study—can't follow directions
	14	13	53	Chronic laziness
	15	7	26	Slowness in written work
	16	5	22	Laziness—frequent absence
	17	9	39	Indifference
	18	17	58	Absence due to home conditions
	19	18	63	Doesn't try—seems immature
	20	34	57	Wastes time in dreaming
	21	12	27	Lack of ambition
	22	25	42	Immaturity

We then selected the most glaring cases of pupils who in marks were below their relative ranking in the intelligence test. Twenty-two of the thirty-one pupils selected for study remained throughout the year so that comparisons with their marks during the last two periods of the year could be made. These twenty-two cases were discussed in a meeting of the teachers to find out why the teachers thought they were not doing work of which they were capable. Table V shows the relative ranking of the pupils, both in the intelligence test and in marks. It also gives the principal reasons assigned by the teachers for poor work.

The amount of differences in ranks in the classes and the average difference is given in Table VI.

TABLE VI. SUMMARY OF DIFFERENCES IN RANKS

Grade	Pupils	Total of Differences in Position
XII	3	30
XI	2	26
X	6	98
IX	11	286
Total.....	22	440

Average difference in position: 20

Table VI indicates, therefore, that these 22 pupils averaged 20 positions lower in their ranking by marks than by the intelligence test.

It is evident, however, that the opportunity for displacement in relative ranking in a small class is not equal to that in a large class. For example the margin separating the eighteenth from the nineteenth pupil in a class of 26 is larger than the margin between the eighteenth and nineteenth pupils in a class of 74. The figures should, therefore, be reduced to a common basis if statistics covering them all are to be of value. It would seem to be easiest to reduce all classes to a basis of grade IX in which there were 74 pupils. To do this, we may simply multiply the rankings given in Table V by the quotient found by dividing 74 by the number in each class. These quotients are 2.8 for grade XII, 2.7 for grade XI, and 1.6 for grade X. The rankings adjusted by this method give the differences in positions shown in Table VII. Ac-

According to this adjustment the differences in position were such that if each of the three smaller classes had been enlarged to 74 pupils, without changing its characteristics, each pupil would have averaged 27 ranks lower in marks than in intelligence score.

TABLE VII. ADJUSTED DIFFERENCES IN POSITIONS

Grade	Pupils	Adjusted Differences in Position
XII	3	84
XI	2	70
X	6	157
IX	11	286
Total.....	22	597

Average difference in position: 27.1

After these facts were compiled a letter was sent to the parents of each of these 22 pupils explaining the intelligence test, the difference in standing between the pupil's ranking in this and in his marks, and the reason assigned by the teachers for this poor showing. The parents were asked to aid the school in bringing these pupils nearer to their proper standing as shown by their intelligence records. Table VIII shows the relative standing of the pupils in the Otis test and in their marks for the first two periods and for the last two periods of the year. It should be noted that the rankings are given as *adjusted to the class of 74 pupils*.

Sixteen pupils, as shown in Table VIII, gained in position from two to thirty points. The total gain was 176 points or 11 per pupil. Six pupils showed a loss of 53 points or 8.8 per pupil. For the entire twenty-two the net gain was 123 points or 5.5 per pupil.

This investigation shows that, of the pupils making the largest gains, numbers 7, 9, and 10 were pupils whose poor work seemed to be due to home or social activities, matters which could be corrected. Number 5 was reported as lacking knowledge of how to study. Special attention was given to aid her in her study habits with a resulting gain of 30 points in her standing. Number 15, who was reported as slow in written work, had probably been marked unfairly because some teachers did not appreciate his real ability. The four pupils who made the largest losses, numbers

TABLE VIII. RELATIVE STANDING OF PUPILS IN OTIS SCALE AND IN MARKS FOR FIRST AND SECOND PERIODS

GRADE	PUPIL	OTIS RANK	RANKS ON TEACHERS' MARKS		GAIN	LOSS	TEACHERS' MARKS IN PERCENTS		GAIN	LOSS
			First	Second			First	Second		
XII	1	6	36	34	2		83.5	85.2	1.7	
	2	14	48	31	17		78.8	86.1	7.3	
	3	48	67	70		3	73.3	77.7	4.4	
XI	4	8	38	35	3		79.3	77.1		2.2
	5	14	54	24	30		74.4	80.6	6.2	
X	6	6	29	27	2		76.5	75.2		1.3
	7	8	48	19	29		69.7	78.5	8.8	
	8	27	59	56	3		63.6	62.6		1.
	9	16	35	21	14		74.8	78.4	3.6	
	10	29	50	31	19		71.0	73.	2.	
	11	34	56	53	3		68.4	66.7		1.7
IX	12	1	15	30		15	82.5	77.3		5.2
	13	4	29	27	2		79.5	80.1	0.6	
	14	13	53	61		8	70.5	63.7		6.8
	15	7	26	10	16		80.2	87.1	6.9	
	16	5	22	18	4		82.7	83.1	0.4	
	17	9	39	46		7	75.5	72.6		2.9
	18	17	58	60		2	69.	64.7		4.3
	19	18	63	52	11		67.2	69.7	2.5	
	20	34	57	47	10		70.	72.2	2.2	
	21	12	27	45		18	80.	73.1		6.9
	22	25	42	31	11		74.2	76.7	2.5	

12, 14, 17, and 21, were reported as "lacking ambition," "lazy," and "indifferent." Evidently these drawbacks were not corrected by the methods used as the last standing was worse than the first. These special notes show how the tests can be used to follow up individual cases.

The average of all the pupils for the first period was 74.7 percent and for the last period, 75.5 percent; a gain of only 0.8 percent. This is, however, of little significance unless we know how the marks of all the other pupils compared. The figures given as to relative standing in the class are of more significance. These

TABLE IX. CHANGES IN TEACHERS' MARKS BETWEEN THE FIRST AND SECOND PERIODS

Grade	First Mark	Second Mark	Gain	Loss
XII	78.5	83.0	4.5	
XI	76.8	78.8	2.0	
X	70.7	72.4	1.7	
IX	75.6	74.6		1.0

figures show that the sixteen pupils who gained made a considerable increase. Of the six who lost, two brought the record down very much by losing 15 and 18 places respectively. It seems, therefore, very safe to say that intelligence tests will be found useful as one factor in stimulating pupils to the best work of which they are capable.

The results of this experiment may be summarized as follows:

1. There was a very high correlation between Forms A and B of the Otis Scale.
2. There was a fairly high correlation between the Otis test and the teachers' marks.
3. There was a very definite tendency for the youngest pupils to make the best records.
4. A considerable gain was produced by using these tests with 22 pupils to bring their work up to a standard nearer that shown by the results of the intelligence test.

RAYMOND: A CASE STUDY ILLUSTRATIVE OF THE DIAGNOSTIC LIMITATIONS OF A QUANTITATIVE SCORE

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The case of Raymond is presented here as suggestive of a class of children whose departure from the accepted standards of behavior and proficiency makes them conspicuous problems in the schoolroom. A surprising discrepancy is observed between the demonstrated ability of these children to learn school subjects by the usual school methods and an intelligence quotient, determined on such a scale as the Binet. The educational prescription can be most effectively determined by the analytical consideration of the child in his efforts to learn, such a study supplementing the tests and completing the diagnosis.

Raymond has been under careful observation and special instruction for twelve school months, the educational procedures varying as one failed and another seemed feasible. He is now (September, 1920) eight years and nine months old and has been in school without long absences since he was five. His intelligence quotient (Binet) in June, 1920, was 105.

So difficult and uncertain, however, is the process of learning school subjects that he has made comparatively little progress. In June, he scored 2 on Haggerty's Achievement Test, Sigma 1, and 1 on Test 2. When school closed he had read with great effort some fifty pages of a first reader. Now, three months later, he can scarcely read acceptably the primer which preceded the other book and which he must have first encountered over two years ago. He writes very well, forming the letters with care. He does not copy accurately, however, omitting and substituting letters. He has acquired a few number facts; but he is not keen at problems, answering impulsively and without much deliberation. His spelling vocabulary is very limited and, like all of his school performances, erratic-fair today, impossible tomorrow. He is fond of stories, but takes little part in language activities. As he talks, his lips tremble and his voice is forced as though his jaws were set. He is not timid.

An observer characterizes him at once as "queer looking." His ears are prominent and his thin little body supports a head

disproportionate in size and slightly brachycephalic. His blue eyes are very wide open and he works feverishly.

There are days when the dynamics of an idea carry him into appropriate action with such sudden discharge that he is up and gone before one can stop him. As he dashes into the hall, his teacher calls, "Raymond, it is nearly recess time. Shall we wait for a few m'utes?" He always agrees readily, and settles down to his work without the slightest display of discomfort. Again, he seizes his pencil, making a precipitate dash for the sharpener. In the midst of what appears to be close application to his assignment, the idea of drawing pictures, which he does with fair skill, or of making paper furniture perhaps, gains ascendancy. Raymond discards all else and is presently seen suiting the action to the idea.

A situation requiring organization and the focusing of certain competencies for the achievement of an unaccustomed end is a very difficult one for Raymond. He can neither persist along a certain line for any considerable time nor can he muster his forces efficiently at the start. Given a paper, upon which appear two or three simple questions and the number of the page upon which the answers may be found, he is occupied for some time; but he accomplishes nothing, although it is determined that the task is not beyond either his reading ability, meager as it is, or his comprehension. He is always "just going to do it."

This mental ineffectiveness has resisted all attempts at correction. It results in an exceedingly limited daily output, and has been an emphatic obstacle to his educational progress. There is no malice in his conduct. He does the best he can, and he is pitifully conscious at times of his failures.

The retentive phase of Raymond's memory is conspicuously disturbed. "Where is your book, Raymond? Boys in this class need their books every day, you know." After a search for the missing reader, he laughs and explains that he had left it "out in the hall on the top step." A futile trip to the stairway follows. "You must find your book, Raymond, now." Bewildered and excited he dashes out of the room and presently we see him pass the window on the run. The book was at home and when he finally remembered where it was he had intelligence enough to go after it without consulting anyone. This is a typical reaction. School material, notes or forms to be signed by his parents and

returned, rubbers or a sweater to be taken home, all slip through his memory like water through a sieve. He even forgets that he has not finished his assignment of work and merrily engages in some other pursuit after an interruption for a reading lesson.

This unfortunate lack of retentiveness displayed in the everyday affairs of his life is emphasized for symbols, particularly words. His associations are weak and any system intended to teach a reading vocabulary by rote learning, therefore, holds no advantage for Raymond. When he comes upon a word which he cannot recognize, he cannot remember where he saw it before, where he heard it or read it last, nor where in his book to look for the sentence if he could keep in mind such a prop to lean upon. We have tried writing the word, saying it aloud at the same time, spelling it, and calling attention to details such as "two t's in the middle" of the word. We have used pictures, alphabet cards, word cards, sentence strips, flash cards, and what not to stimulate in every way for a given word. We have worked on phonetic words, and, as he has no difficulty with blending, he gets along fairly well for a time. Then, without warning, he may begin the application of phonics to every word he sees—and English is not a consistently phonetic language. All our efforts to reinforce weak visual imagery avail us nothing. Raymond cannot read. Furthermore, he seems to have an "idiosyncrasy" for certain words, particularly "spring." Special emphasis has again and again been given it, and he has had months of experience with books in which it occurs often. If the word were presented to him at this moment, the chances are about even that he would not know it. Doubtless faulty attention explains some of this, but some special disability adds to the sum total of his handicaps.

It is interesting to note the father's statement. He says that Raymond is "just like" himself. He is a broker and has resorted to a system of "memory training" because he could not remember his price lists. He undertook to teach his son to read by this same device. He admits that the plan was a failure.

Visual imagery not concerned with symbols seems to be adequate. Raymond possesses a certain manual dexterity which enables him to construct paper toys nicely without a copy, to build with blocks, and to handle tools for simple woodwork. But his resources are soon exhausted and he resorts to building the same thing day after day. Last spring he made pin-wheels every afternoon for days after we had each made one to take home. At

last we aimed his ideas in another direction and he became an ardent builder of garages.

On the Binet scale in June, 1920, he failed on the following tests: eight-year—counting backwards; nine-year—date, making change, repeating four digits backwards; ten-year—all except the absurdities. One-half of the design (a) was correct. (In September, 1919, the other half of the design was correct.) His plan for the ball and field was a spiral.

His basal age was seven years; his mental age was eight years and nine months. This quantitative expression of results is not an adequate statement of the situation. The emotional instability which Raymond exhibits is not a determining factor in the test, nor is the memory disability. His attention is persistent enough for each test, and his trainability for facts is high enough so that in his nearly nine years of existence he has acquired enough information to carry him through. It requires a qualitative analysis of behavior to set forth the facts in the case.

We do not know the cause of the boy's condition, but we have a theory. We know that he was not physically perfect at birth, a slight operation being necessary before micturition could be accomplished. We know that he was frail, "almost had the rickets," and did have acute adenitis when one year old.

After a Herculean effort on our part, his parents were persuaded in November, 1919, to have his tonsils, which had been badly diseased for a long time, removed. At the same time, the dentist extracted eight ulcerated teeth. Raymond was then seven years and ten months old. We were encouraged by the fact that he was calmer after this, and that *for the first time in his life*, he was persuaded to eat solid food. We very soon found, however, that he resisted learning just as before, and that he was equally unstable at times; though it is true that such times were somewhat less frequent.

Six months after this experience, Raymond weighed 48.5 pounds, was 48.8 inches tall, and a physician diagnosed his case as one of vegetative hypotonia. After four months of delay, the parents have not yet adopted the vitamine feeding prescribed, and we believe that the boy's nervous system is so devitalized by disease and lack of proper nourishment that he presents a clinical picture of irremediable mental defect. If there ever was a time when the nervous mechanism could have been aided to make a harmonious and consistent contribution toward standard behavior, we fear that time has passed.

RATING THE GENERAL APPEARANCE OF PRIMARY NUMBER WORK

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Professor Bagley says in his book on classroom management that: "One of the most accurate indices of a teacher's efficiency is the character of the papers and of the black-board work that his pupils produce."¹ The same author also says that: "Neat papers and neat blackboard work involve a number of little, specific habits, and each of these must be taken up and drilled upon apart from the others, and in some measure, apart from the content or thought of the work that is being expressed."

Some teachers are apt to be concerned entirely with the accuracy of number papers and to neglect their appearance, provided the work is correct. Superintendents, principals, and, for that matter, teachers themselves have only a limited amount of time to devote to this detail. However, it is an important one and it must receive enough attention to obtain good results. Many teachers require neat papers, but in any large system of schools there are always some who in this respect as well as in others need considerable supervision. To remedy this fault as far as possible and with least outlay of time and effort, the chart which is here described was devised for rating the general appearance of number work.

This particular chart is not offered as something scientifically accurate—it was not constructed in the shade of a great university, nor is it the result of work with thousands of pupils, hundreds of assistants, and some professors. Nevertheless, it has proved to be practical, because it gets results; and it is offered as a suggestion to other busy school officers. If some such device as this is occasionally in evidence, work of the type shown in specimens 1, 2, and 3 will be very rare.

For the benefit of those who wish to construct a general appearance chart, it is suggested that they gather up the number papers of from five hundred to one thousand pupils in grades I to V.

¹ Bagley, W. C. *Classroom management; its principles and technique*. New York: Macmillan Company, 1916.

CHART FOR RATING THE GENERAL APPEARANCE OF PRIMARY NUMBER WORK

No. 1	No. 2	No. 3
$2 = 1 + 1$ $3 = 2 + 1$ $4 = 2 + 2$ $4 = 3 + 1$ $5 = 2 + 3$	$5 = 3 + 2$ $5 = 4 + 1$ $6 = 3 + 3$ $6 = 5 + 1$	$6 \times 6 = 36$ $36 \div 6 = 6$ $36 \div 10 = 3 \frac{6}{10}$ $36 \div 4 = 9$ $4 \times 9 = 36$ $36 \div 8 = 4 \frac{4}{8}$ $5 \times 7 = 35$ $35 \div 7 = 5$ $7 \times 4 = 28$ $28 \div 4 = 7$ $8 \times 3 = 24$ $24 \div 3 = 8$ $6 \times 6 = 36$
No. 4	No. 5	No. 6
$6 \times 6 = 36$ $36 \div 6 = 6$ $36 \div 10 = 3 \frac{6}{10}$ $36 \div 4 = 9$ $4 \times 9 = 36$ $36 \div 8 = 4 \frac{4}{8}$ $5 \times 7 = 35$ $35 \div 7 = 5$ $7 \times 4 = 28$ $28 \div 4 = 7$ $8 \times 3 = 24$ $24 \div 3 = 8$ $6 \times 6 = 36$ $36 \div 6 = 6$ $36 \div 10 = 3 \frac{6}{10}$ $36 \div 4 = 9$ $4 \times 9 = 36$ $36 \div 8 = 4 \frac{4}{8}$ $5 \times 7 = 35$ $35 \div 7 = 5$ $7 \times 4 = 28$ $28 \div 4 = 7$ $8 \times 3 = 24$ $24 \div 3 = 8$	$75 \div 2 = 37 \frac{1}{2}$ $14 \div 2 = 7$ $13 \div 2 = 6 \frac{1}{2}$ $12 \div 2 = 6$ $11 \div 2 = 5 \frac{1}{2}$ $10 \div 2 = 5$ $9 \div 2 = 4 \frac{1}{2}$ $8 \div 2 = 4$ $7 \div 2 = 3 \frac{1}{2}$ $6 \div 2 = 3$ $5 \div 2 = 2 \frac{1}{2}$ $4 \div 2 = 2$ $3 \div 2 = 1 \frac{1}{2}$ $2 \div 2 = 1$ $1 \div 2 = \frac{1}{2}$	$23 \div 2 = 11 \frac{1}{2}$ $22 \div 2 = 11$ $21 \div 2 = 10 \frac{1}{2}$ $20 \div 2 = 10$ $19 \div 2 = 9 \frac{1}{2}$ $18 \div 2 = 9$ $17 \div 2 = 8 \frac{1}{2}$ $16 \div 2 = 8$ $15 \div 2 = 7 \frac{1}{2}$ $14 \div 2 = 7$ $13 \div 2 = 6 \frac{1}{2}$ $12 \div 2 = 6$ $11 \div 2 = 5 \frac{1}{2}$ $10 \div 2 = 5$ $9 \div 2 = 4 \frac{1}{2}$ $8 \div 2 = 4$ $7 \div 2 = 3 \frac{1}{2}$ $6 \div 2 = 3$ $5 \div 2 = 2 \frac{1}{2}$ $4 \div 2 = 2$ $3 \div 2 = 1 \frac{1}{2}$ $2 \div 2 = 1$ $1 \div 2 = \frac{1}{2}$
No. 7	No. 8	No. 9
$6 \div 3 = 2$ $6 \div 2 = 3$ $10 \div 2 = 5$ $8 \div 2 = 4$ $4 \div 5 = 2$	$9 \div 4 = 2 \frac{1}{4}$ $9 \div 2 = 4 \frac{1}{2}$ $9 \div 5 = 1 \frac{4}{5}$ $9 \div 7 = 1 \frac{2}{7}$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 \div 8 = 1$ $8 \div 1 = 8$ $7 \div 2 = 3 \frac{1}{2}$ $7 \div 4 = 1 \frac{3}{4}$ $7 \div 7 = 1$ $7 \div 1 = 7$ $6 \div 2 = 3$ $6 \div 3 = 2$ $6 \div 6 = 1$ $6 \div 1 = 6$	$23 \div 2 = 11 \frac{1}{2}$ $20 \div 4 = 5$ $23 \div 11 = 2 \frac{1}{11}$ $20 \div 10 = 2$

No. 10

$$\begin{array}{r|l} 75\frac{1}{6} & 12 \\ 14\frac{3}{4} & 27 \\ 13\frac{1}{2} & 42 \\ 11\frac{7}{9} & 56 \\ \hline 72 & 72 \end{array}$$

No. 11

$$\begin{aligned} 17 \div 3 &= 5\frac{2}{3} \\ 17 \div 2 &= 8\frac{1}{2} \\ 16 \div 5 &= 3\frac{1}{5} \\ 16 \div 3 &= 5\frac{1}{3} \end{aligned}$$

$$\begin{aligned} 18 \div 17 &= 1\frac{1}{17} \\ 17 \div 12 &= 1\frac{5}{12} \\ 17 \div 11 &= 1\frac{6}{11} \\ 17 \div 10 &= 1\frac{7}{10} \end{aligned}$$

No. 12

1	$\begin{aligned} 725 &= 45 \\ 45 &= 295 \end{aligned}$	$\begin{aligned} 48 &= 3 \\ 3 &= 4 \end{aligned}$	$\begin{aligned} 45 &= 15 \\ 15 &= 5 \end{aligned}$
2	$\begin{array}{r|l} 75\frac{1}{6} & 12 \\ 14\frac{3}{4} & 27 \end{array}$		$114\frac{5}{6}$

No. 13

$17 \div 4 = 4\frac{1}{4}$	$18 \div 12 = 1\frac{1}{2}$	$4 \times 4 = 16$
$17 \div 3 = 5\frac{2}{3}$	$18 \div 16 = 1\frac{1}{8}$	$5 \times 3 = 15$
$17 \div 2 = 8\frac{1}{2}$	$18 \div 17 = 1\frac{1}{17}$	$9 \times 6 = 18$
	$17 \div 10 = 1\frac{7}{10}$	$6 \times 3 = 18$

No. 14

1.	$\begin{aligned} 725 &= 45 \\ 45 &= 295 \end{aligned}$	$\begin{aligned} 48 &= 3 \\ 3 &= 4 \end{aligned}$	$\begin{aligned} 45 &= 15 \\ 15 &= 5 \end{aligned}$
2.	$\begin{array}{r|l} 75\frac{1}{6} & 12 \\ 14\frac{3}{4} & 27 \\ 13\frac{1}{2} & 42 \\ 11\frac{7}{9} & 56 \end{array}$		$114\frac{5}{6}$

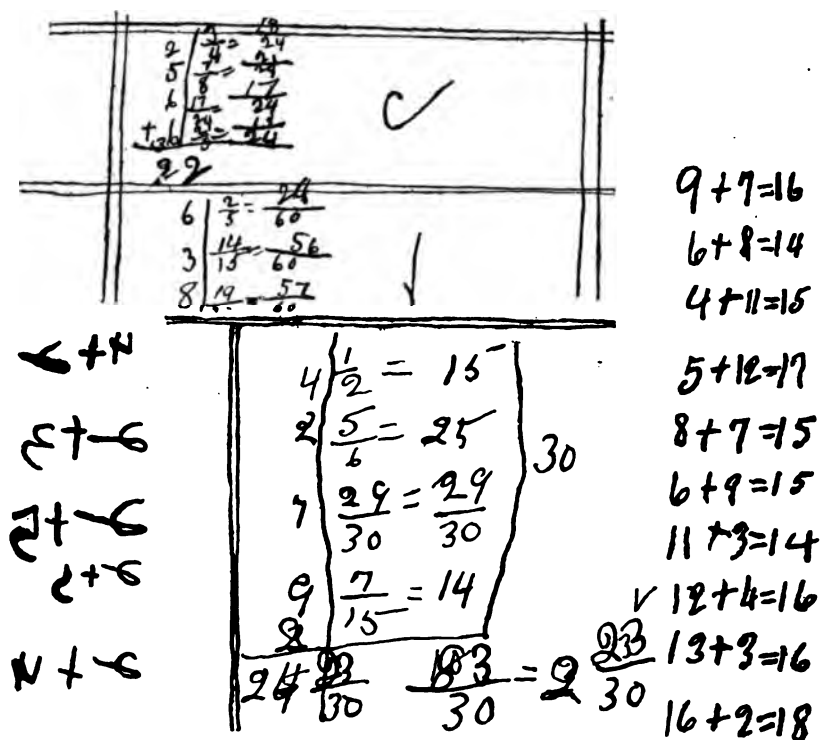


Figure 1

This should be done without previous warning to pupils or teachers. From these papers one will find an abundance of material with which to construct a chart. The papers should be carefully divided into fourteen or fifteen groups, according to excellence of appearance. One sample should then be selected from each group and cut down to a size convenient to use on a chart. The samples should then be fastened temporarily with paper clips to separate pieces of cardboard. Each specimen, when thus mounted, should be identified by a letter. In Figure 1, for example, the specimen is marked F. One may now rearrange the various specimens in what is judged to be the correct order, from the poorest to the best. It is desirable to have the judgment of several teachers in regard to arrangement, first, because many opinions are better than one and second, because it is wholesome for the teachers to have a hand in such matters.

A good way to secure the judgments of teachers is to hectograph copies of Figure 2, giving one copy to each teacher with instructions to record the arrangement of the samples which she thinks is best. She can do this by writing the identification letters in the blank spaces, thus producing a result like that shown in Figure 3. One may then figure out the correct order in which the specimens should be placed on the final chart. When this is done, one has something that is as useful as the "Graphometer" eye-test cards or any other chart commonly used in school work.

Figure 4 shows the ratings of 128 papers according to the "Chart for Rating the General Appearance of Primary Number Work." The pupils were distributed from the first to the fifth grade. This graph vividly shows the great range in quality of the papers, judged only from appearance. The distribution is nearly as great as are typical distributions for accuracy. For example, Figure 5 shows a distribution according to accuracy. The material is obtained from the use of Courtis Standard Tests in Arithmetic, Series B, Addition.

The irregular line on Figure 4 shows the median scores in general appearance for the various grades. Grades I, III, and IV are probably about normal. Collection was made in the second grade on a day when the teacher had tried to secure extra good papers. In the case of grade V, the work is decidedly uneven. There is an apparent lack of responsibility on the part of the teacher and pupils for the general appearance of the written work. No amount of explaining by the teacher that this was an unusual day is sufficient excuse for this slovenly work.

Figure 6 is a diagram of the actual relation of general appearance to accuracy in a set of fifth-grade papers. The figures at the bottom denote the eight different percentage ratings assigned to the papers by the teacher. The papers were marked on accuracy alone and the examples were either right or wrong. Effort did not count. It will be noticed that many of the best papers have a very low rating for general appearance.

The data here presented are not sufficient to warrant us in drawing definite conclusions. They do, however, point out the fact that the general appearance of primary number work is not necessarily closely correlated to accuracy. In many cases habits of neatness must be developed aside from those of accuracy. It

1 Best goes here	2	3
4	5	6
7	8	9
10	11	12
13	14	15 Poorest goes here

FIGURE 2. A SUGGESTED FORM FOR
USE IN SECURING TEACHER'S
JUDGMENTS

1 C	2 B	3 A
4 F	5 K	6 H
7 D	8 M	9 J
10 E	11 O	12 N
13 G	14 Q	15 I

FIGURE 3. THE SUGGESTED CHART
(FIGURE 2) AS MADE OUT BY A
TEACHER

GRADE	GENERAL APPEARANCE													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	••	•••	•••	•••	•	•	•	••						
2		•	••	••	••	••	••	••	••	••	••	•	•	
3					•	••	•	••	••	•		•		
4						•	•	••	•	••	••	••	•	•
5		•	•	••	••	••	••	•	••	••	••	••	••	

FIGURE 4. DISTRIBUTION OF PAPERS ACCORDING TO GRADE AND
GENERAL APPEARANCE

may be that the higher pupils go in the grades the greater the correlation between neatness and accuracy. In the eighth grade it may be very high, but no close relationship exists in the case of the pupils we have considered.

GRADE	NUMBER OF EXAMPLES RIGHT																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
4	••••• ••	••	••	•••	•••	••	•											
5	••	••	•••	••	••	•••	••	••	•	•		•		•				
6	••	••		•	••	••	•••	••			••	••		••				
7		••	•••	•••		••	••	••	••	•	•	•						
8		••	•	••	•••	•	••	•••	••	••	•	•			•			
H	•	•		••	••	•	••	••	••	••	•	••	•	••	•			•

FIGURE 5. AN EXAMPLE OF DISTRIBUTION ACCORDING TO ACCURACY
—COURTIS STANDARD RESEARCH TESTS IN ARITHMETIC
SERIES B. ADDITION

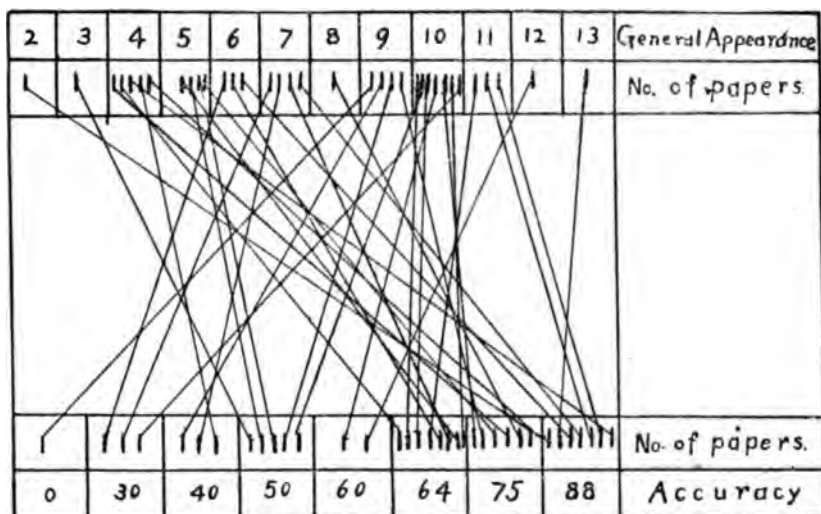


FIGURE 6. RELATION OF APPEARANCE TO ACCURACY IN FIFTH-
GRADE PAPERS

METHODS OF INTERPRETING RESULTS IN THE CLEVELAND ARITHMETIC TESTS

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In a number of respects the Cleveland Survey Arithmetic Tests are the best we have for determining by group methods the relative strengths and weaknesses of a class, a school, or a school system in fundamental operations. These tests, however, are fifteen in number, and when one comes to the practical necessity of organizing the results for the several grades of the different schools of a system, one becomes painfully aware of the need of some weighting scheme for the condensation of the data. Only by such condensation can a report show to the average citizen, who votes school funds, and to the educational people who use them, just what each should know about the schools. Several survey reports of large systems tested with the Cleveland tests have appeared, and all seem clearly to reveal this need. Many tables and figures are found in these reports, but in no case does a final summarizing graph show just the status of a system in all the fundamental operations together.

An attempt was made to present such a showing after the Cleveland Survey Tests had been given to the children in the B grades of the Peabody demonstration school.¹ The median scores in each of the fifteen tests as obtained at Cleveland² and Grand Rapids³ were accepted as norms, and the corresponding medians for the demonstration school were expressed as percents of these norms. Thus a percent of more than 100 indicated that for the grade and test in question the result at the demonstration school was better than the norm, while a percent of less than 100 indicated the opposite. Table I shows these percents, those less than 100 being in heavy type.

¹ In this school, which is connected with the George Peabody College for Teachers, educational surveys—and usually mental surveys also—are made annually.

² Judd, Charles H. *Measuring the work of the public schools*. Cleveland, Ohio: The Survey Committee of the Cleveland Foundation, 1916. 290 pp.

³ *School survey, Grand Rapids, Michigan*, 1916.

Table I shows clearly certain weaknesses which would probably not have been pointed out for correction if certain tests of less diagnostic value had been employed. For instance, it is evident that in the demonstration school disproportionate emphasis has been placed on the simpler aspects of addition—adding a few single-digit numbers. At the same time the more complex processes in this operation have been neglected. Pupils have not been drilled enough in retaining the accumulating sums of long columns and in the process of carrying to other columns. Tested by the Courtis tests, the school would doubtless have shown a general weakness in addition which the teachers would have tried to correct by more emphasis on the very thing now overdone, according to our norms—namely, quick addition of short columns without carrying. Similar benefits of more careful analysis than is usual are also evident in some of the other operations, particularly in multiplication and in division. The more complex processes in these operations need more drill.

But this method of showing results is capable of improvement. Absolute scores are often of little significance unless norms are shown not only for the grade tested but also for the grades above and below it. Such norms are unobtainable in cases of tests—as the Monroe Standardized Reasoning Tests and the Monroe Standardized Tests in Silent Reading—that are different for upper and lower grades. The justification for the use of such tests is the practical difficulty of getting tests with enough progressively harder steps of equal size to discriminate sufficiently well between the abilities of any two consecutive grades, from the lowest to the highest—a difficulty clearly shown for example, in the Trabue Language Scale. Upper and lower norms, as well as norms of the grade tested, shown either in tables or graphs, or both, add considerably to the interpretative value of reports, both for individual and for group diagnosis; and it is not difficult to show such norms when all grades take the same test.

It is also desirable, if possible, to interpret the deviation from norms or standards in terms of years of progress. As our schools are organized a year's work is a natural unit of measure, and even the better trained educators—to say nothing of parents and the general citizen who are always to be kept in mind—think of retardation or acceleration in terms of years (or grades). This

unit, moreover, is the one most successfully used in the conventional tables and reports. Though progress from grade to grade is not always the same in absolute amount, it is the same in the practical sense that it always takes the same time to secure it.

Finally, it is obviously desirable for facilitating a general rating of a grade, or school, or system to bring together somehow the results of the several tests into a single table, or graph. The citizen who votes the support of the schools is particularly interested in this final, simple form of the results, while the experts only—the teachers, supervisors, and administrators—who should have the time to study details relative to their respective duties, are interested in the smaller diagnostic features of the report.

Recently the writer found himself confronted with the necessity of devising a satisfactory method of condensing reports on the Cleveland Survey Arithmetic Tests, or of adopting tests inferior for the purpose in view. The usual situation was complicated by the fact that a large proportion of the children to be tested were negroes, whose status was to be separately shown. The school system to be surveyed was that of Paducah, Kentucky, where at the time of the survey 3,303 pupils were in attendance. Limited funds compelled us to make the report on educational measurements comparatively short.

To meet these practical demands of limited space and yet to present numerically all the medians (absolute scores) in relation to norms of various grades, we decided to use the form shown in Table II. This form of report could be used to show conditions by buildings as well as for the system as a whole.

In the present paper, however, we have omitted the scores of the several schools, and have shown only the medians of all the scores of whites and of negroes of each grade. In a small system it is possible also to include in the general table the medians of the several schools, as is illustrated in Table III for grade *IV A*; but in most surveys a table of this sort would become so bulky as to prevent a careful study of the more generally significant aspects of the data. In such cases each yearly grade could probably be shown in a separate table similar to Table III. Even then, however, a general summary such as that shown in Table II, would also be advisable, both to bring the whole situation within easy grasp and also to facilitate the construction and comprehension

TABLE I. RATIO OF MEDIANS AT THE DEMONSTRATION SCHOOL TO THOSE AT CLEVELAND AND GRAND RAPIDS

Grade	No. of Pupils	Comparison City	Tests ^a																
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Av.	
VIII B	34	Cleveland Grand Rapids	113 105	138 118	129 127	98 108	103 107	108 108	91 90	112 111	76 88	70 70	64 82	77 61	66 60	39 50	36 33	88 88	
VIII B	32	Cleveland Grand Rapids	101 102	95 96	114 114	101 114	34 69	93 82	85 82	39 33	75 79	82 75	79 75	94 70	67 67	50 51	49 50	77 77	
VII B	31	Cleveland Grand Rapids	90 85	85 111	72 77	78 94	44 50	67 70	73 75	36 32	32 43	73 73	71 111	72 61	53 47	59 91	64 57	65 72	
VB	22	Cleveland Grand Rapids	96 106	84 98	84 84	130 164	61 77	75 83	77 89	60	13 71	50 58	29 67	40 43	42 50	..... .....	..... .....	65 83
IV B	32	Cleveland Grand Rapids	95 125	84 120	83 140	60 108	56 73	61 107	64 113	..... .....	..... .....	31	75	58	40 .....	..... .....	..... .....	63 112
Average		Both	103	103	102	106	67	86	84	60	60	65	65	64	54	57	48	79	

^a Explanation of tests: A is addition, two digits; B, subtraction, one operation; C, multiplication, two digits; D, simple division, one-digit answers; E, addition of single columns of five digits in each column; F, subtraction with borrowing, simple; G, multiplication, a number of four digits by one of one; H, fractions with common denominators, addition and subtraction; I, division, one-digit numbers into five-digit numbers; J, addition of single columns of thirteen digits in each; K, simple long division, divisor of two-digit numbers; L, multiplication of four-digit by two-digit numbers; M, addition of five four-digit numbers; N, long division by two-digit numbers, all quotients coming out even; O, simple fractions, the four operations.

TABLE II. MEDIAN SCORES AT PADUCAH IN THE CLEVELAND ARITHMETIC TESTS

Grade	No. of Pupils	Tests ^a														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
VIII Whites	51	22.5	19.1	16.8	18.8	4.9	7.9	5.0	2.4	4.1	4.1	7.4	3.5	4.0	1.4	1.2
VIII Negroes	21	24.2	17.8	15.7	14.5	4.8	7.3	3.9	1.0	1.6	2.9	3.9	2.3	3.1	0.7	2.5
St. Louis Grand Rapids		32.2	28.3	21.9	25.7	8.4	11.3	7.8	12.0	5.8	5.8	11.7	5.3	5.3	2.7	6.6
VIII Whites	81	30.3	25.5	20.7	23.0	8.1	11.0	6.8	8.8	4.7	6.5	10.3	4.9	5.7	2.3	4.6
VIII Negroes	9	27.1	18.6	15.8	16.3	5.3	6.7	5.0	3.7	2.4	3.4	6.0	2.8	3.3	1.4	1.9
St. Louis Grand Rapids		20.8	21.3	13.5	16.5	6.2	8.5	3.3	8.2	1.5	3.5	7.7	2.3	4.5	0.9	2.4
VIII Whites	96	32.3	26.7	20.7	23.8	8.0	10.1	7.4	10.8	5.4	5.4	10.3	5.2	5.2	2.6	6.1
VIII Negroes	23	29.5	22.8	19.3	20.5	7.8	10.3	6.7	8.6	4.0	5.7	9.7	4.9	5.7	2.0	5.5
St. Louis Grand Rapids		24.3	17.5	15.7	17.7	5.0	6.4	4.9	3.0	2.1	3.5	6.8	3.1	2.9	1.4	1.7
VIII Whites	104	23.5	13.7	14.5	11.5	4.1	4.7	4.2	5.4	0.8	2.6	3.1	1.3	2.6	0.7	0.6
St. Louis Grand Rapids		28.4	24.2	19.8	22.3	7.4	9.6	6.9	9.7	5.0	5.3	9.7	4.7	4.9	2.0	5.6
VIII Whites		27.3	20.7	18.8	19.7	7.2	9.6	6.1	7.8	4.1	5.3	8.8	4.5	5.0	1.8	4.6
St. Louis Grand Rapids		21.4	17.7	13.7	15.3	4.8	5.7	4.3	4.0	1.6	3.3	4.6	2.0	2.7	0.8	1.0
VIII Whites	97	27.8	22.8	18.9	21.3	6.6	8.5	6.4	9.5	4.5	5.2	8.3	4.6	4.5	2.0	4.8
VIII Negroes	39	26.5	21.3	17.7	18.4	7.2	9.3	6.1	9.0	3.8	5.4	7.5	4.3	4.9	1.7	3.9
St. Louis Grand Rapids		19.8	15.7	13.3	12.7	5.1	5.1	4.1	4.3	1.3	3.2	3.8	1.9	3.3	0.8	0.9
VIII Whites	90	18.3	16.3	16.5	14.3	4.7	5.5	4.1	2.4	1.3	2.9	3.8	1.6	2.2	0.7	0.8
St. Louis Grand Rapids		26.4	20.6	18.3	20.5	7.1	8.3	6.2	8.1	4.1	5.1	7.4	4.1	4.4	1.8	4.1
VIII Whites		25.0	19.1	17.0	16.9	6.6	8.0	5.6	6.5	3.0	4.5	6.5	3.6	4.5	1.4	3.6
St. Louis Grand Rapids		16.8	14.9	13.0	12.3	4.5	4.1	3.8	3.2	0.8	3.0	3.0	1.6	2.8	0.8	1.1
VIII Whites	90	26.3	20.3	18.2	19.3	6.9	8.0	5.9	8.0	3.9	5.0	6.9	4.3	4.2	1.6	3.6
St. Louis Grand Rapids		22.8	16.8	15.5	15.5	6.0	7.1	5.3	6.2	2.3	4.1	5.4	3.3	4.3	1.1	3.5

^a For description of tests see Table I.

[illegible]

TABLE III. ILLUSTRATING METHOD OF SHOWING MEDIANES OF SEPARATE SCHOOLS FOR EACH GRADE—
CLEVELAND ARITHMETIC TESTS. DATA FOR GRADE IVA

School	No. of Pupils	Tests ^a														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
WHITES.....	102	13.7	10.2	7.8	7.1	3.7	3.6	2.4	1.8	0.6	2.3	1.0	0.8	1.3	0.5	0.6
Washington.....	24	13.6	10.8	8.3	7.8	3.6	4.4	2.8	4.4	0.5	2.4	1.4	0.8	1.6	0.5	0.5
Whittier.....	12	13.3	8.3	8.7	9.0	3.3	3.5	1.8	3.7	0.7	2.3	2.0	1.0	1.2	0.6	0.6
Franklin.....	26	14.0	10.0	9.0	3.5	4.7	2.5	1.7	0.7	0.6	1.4	0.7	0.8	1.3	0.5	.....
McKinley.....	26	11.7	7.0	6.2	5.0	3.6	3.3	2.5	3.0	.....	1.6	1.1	0.7	0.9	0.5	0.7
Lee.....	14	19.5	15.5	7.5	13.0	3.0	5.0	2.8	2.7	1.0	2.0	1.0	0.8	2.3	0.6	.....
NEGROES.....	36	13.1	10.7	7.5	6.3	4.0	5.1	2.1	2.6	0.5	3.0	0.9	0.6	1.4	0.5	0.6
Lincoln.....	21	14.5	11.3	7.9	7.3	5.2	5.3	2.3	2.2	.....	3.8	1.6	0.7	1.9	0.6	0.7
Garfield.....	15	11.6	8.5	3.5	4.3	2.9	5.1	1.7	3.5	0.5	1.7	.....	0.6	1.2	.....	0.5
NORMS																
St. Louis.....	21.3	17.0	15.4	16.3	5.4	6.0	5.1	5.1	6.8	2.0	3.9	4.0	2.9	3.3	1.1	2.5
Grand Rapids.....	16.4	12.1	11.3	10.4	4.6	4.1	3.3	3.3	.....	0.9	2.8	.....	.....	2.3	.....	.....

^a For description of tests see Table I.

of a subsequent table in which retardation or acceleration would be shown in terms of the grade units which we have advised above.

Such a table was utilized in the Paducah survey. It is here presented as Table IV. It brings out emphatically in small space the median retardation of each grade, and records negroes and whites separately.

A table of this sort can be constructed in a comparatively short time by an intelligent assistant. The method of doing so and the significance of the table can best be made clear by a few concrete illustrations. According to Table II the score of the white children in grade *VIIIA* on test A is 22.5. This is below either of the standards given for the *VIIIA* grade. Glancing down the same column at the standards of lower grades, we note that this score exactly equals the St. Louis standard for grade *VA*, and that it is approximately equal to the Grand Rapids standard for grade *VIB* (22.8). These grades are therefore put down in Table IV under test A, opposite grade "*VIIIA*, Whites" in the lines for St. Louis and Grand Rapids, respectively. The standing of the negroes is indicated in a similar manner. Again, in test B, Paducah grade *VIIIA*, whites, equals approximately St. Louis and Grand Rapids grades *VA* and *VIA*, respectively; and so on. The nearest half-grade in the norms is always chosen. It will be noted that in the case of test H, Paducah is especially low; and that on practically every test the negroes are below the whites. At the right of the table we indicate in terms of years the average distance that the respective Paducah grades were found to fall short of the norms considered. This rating is based on the assumption that the grades indicated under each test are correctly entered. But only the nearest half-grade is given; accordingly, there are slight errors, sometimes in one way, sometimes in the other. It is assumed, however, that these errors will on the whole cancel one another when averaged for the fifteen different tests, since the chances of error in the two directions are practically equal.

It was, of course, impossible thus to rate the lower grades, whose scores were below any available norms. But this is not important as deficiencies in the lower grades are, as a rule, reflected in the higher grades if they are characteristic of the whole system; and it is the upper-grade children that must soon come into competition with children from other systems. A deficiency

TABLE IV. COMPARISON OF PADUCAH SCHOOLS WITH ST. LOUIS AND GRAND RAPIDS STANDARDS

Paducah grade	Comparison City	Tests (for description of tests see Table I)															Paducah is behind (years)	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		All
8A, Whites.....	St. Louis.....	5A	5A	5A	6B	3A	6B	4A	3A	6A	5B	6A	5A	6B	5A	4A	5A	3.17
8A, Whites.....	Grand Rapids...	6B	6A	6A	7B	4A	6A	5A	5A	7A	6B	7B	6A	6B	6A	6B	6A	2.23
8A, Negroes.....	St. Louis.....	6B	5B	4A	4B	3A	5A	3A	3B	3A	3A	4A	4A	4A	4A	4A	4A	4.23
8A, Negroes.....	Grand Rapids...	6A	6A	6B	5A	4A	6B	4A	5B	5A	4A	5A	5B	5B	5B	6B	5A	3.10
8B, Whites.....	St. Louis.....	7B	5B	4A	4A	4A	4A	5B	4A	3A	4A	4B	4A	4A	5A	4A	4A	3.43
8B, Whites.....	Grand Rapids...	7A	6A	6B	6A	5A	5A	5A	6B	6B	5B	6A	5A	5A	6A	6B	6B	2.03
8B, Negroes.....	St. Louis.....	4A	6A	4A	4A	5A	7B	3A	6A	3A	4B	6A	4B	7B	4B	4A	5B	3.03
8B, Negroes.....	Grand Rapids...	5B	7A	5B	6A	6B	6A	4A	8B	5A	5B	7B	5B	6A	5A	6B	6B	2.03
7A, Whites.....	St. Louis.....	6B	5B	4A	5A	3A	5B	4B	3A	4A	4B	6B	5B	4B	5A	4A	4A	2.80
7A, Whites.....	Grand Rapids...	6A	6A	6B	7B	5B	5A	5A	5A	6B	5B	6A	6B	5B	6A	6B	6B	1.60
7A, Negroes.....	St. Louis.....	5A	3A	4B	3A	3B	4B	4B	4B	3B	3A	4B	4B	4B	4B	4B	4B	3.60
7A, Negroes.....	Grand Rapids...	6B	5B	5A	5B	4B	4A	5B	5A	4A	4A	5B	5B	5B	5B	5A	5B	2.50
7B, Whites.....	St. Louis.....	4A	5B	4A	4B	3A	4B	4B	3A	3A	4B	5B	4B	4B	4B	4A	4B	2.93
7B, Whites.....	Grand Rapids...	5A	6B	5B	6B	4A	5B	5B	5A	5A	4A	5A	5B	5B	5A	6B	5A	1.70
6A, Whites.....	St. Louis.....	4B	4B	3A	3A	4B	4B	3A	3A	3A	3A	4A	4A	4B	4A	4A	4B	2.60
6A, Whites.....	Grand Rapids...	5B	5A	5B	5B	5B	5B	5B	5A	5B	5B	5A	5B	5A	5A	6B	5A	1.27
6A, Negroes.....	St. Louis.....	3A	4A	4B	4B	3A	4B	3A	3A	3A	3A	4A	4B	3A	4B	4B	4B	2.37
6A, Negroes.....	Grand Rapids...	5B	6B	6A	5A	4A	5B	5B	5A	5B	4A	5A	5B	4A	5B	5A	5A	1.20
6B, Whites.....	St. Louis.....	3A	4B	3A	3A	3A	3A	3A	3A	3B	3A	3A	4B	4B	4B	4A	3A	2.30
6B, Whites.....	Grand Rapids...	4A	5B	5B	5B	4A	4A	4A	5A	4A	4A	5B	5B	5B	5A	6B	5B	1.07
5A, Whites.....	St. Louis.....	3B	3A	3A	3A	3A	4B	3A	3A	3B	3A	4B	4B	3A	4B	4A	3A	1.87
5A, Whites.....	Grand Rapids...	4B	5B	4B	5B	4A	4A	4A	5A	4B	4A	5B	5B	4A	5B	6B	5B	0.77
5A, Negroes.....	St. Louis.....	3B	3A	4B	3A	3B	3A	3A	3A	3B	3B	4B	4B	3A	4B	4B	3A	1.97
5A, Negroes.....	Grand Rapids...	4B	4A	5B	5B	4B	4A	4A	5A	4B	4A	5B	5B	4A	5B	6B	5B	0.77
5B, Whites.....	St. Louis.....	.....	.....	3B	.....	.....	.....	.....	3B	.....	3A	.....	.....	3A	.....	4B	4B	1.75
5B, Whites.....	Grand Rapids...	3A	3A	4B	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3A	1.33
5B, Negroes.....	St. Louis.....	3A	.....	3B	3B	3A	3B	.....	3B	.....	3A	.....	.....	3A	.....	3B	3B	1.77
5B, Negroes.....	Grand Rapids...	4A	3A	4B	4B	4B	.....	.....	.....	.....	.....	.....	.....	.....	.....	4B	4B	1.00

Table reads: at Paducah the 8A whites attained scores approximately equal to those attained at St. Louis by the 5A grade for Test A, by 5A grade for test B, by the 5A grade for test C.....and by the 5A grade for all tests; these children were according to St. Louis standard 2.17 years behind, etc.

in a certain subject in the lower grades may be due, in fact, to a general emphasis on other lines of work at first, and may be regularly compensated for later.

On the other hand, systems in which the scores are superior to these norms used cannot be accurately rated in the eighth grade by the method exhibited in Table IV; for the comparison norms do not extend above this grade. But this is not a serious defect in the method, for emphasis on any subject may safely be relaxed when the grade norms are reached. For instance, an *VIIIA* grade exceeding by an appreciable amount the St. Louis median of 32.2 in test A might reasonably be excused from further drill on additional work of this sort; and since there is no "grade" significance to progress beyond this standard, it is sufficient to know merely that the norm has been surpassed. In a school system where such acceleration exists its approximate amount can be shown by noting in the table which of the grades below *VIIIA* first reached the norm of this grade.

TABLE V. DEFICIENCY OF PADUCAH SCHOOLS IN TERMS OF YEARS WHEN COMPARED WITH STANDARDS OF ST. LOUIS AND GRAND RAPIDS

GRADES	ST. LOUIS		GRAND RAPIDS	
	Whites Years behind	Negroes Years behind	Whites Years behind	Negroes Years behind
<i>VIIIA</i>	3.17	4.23	2.23	3.10
<i>VIIIB</i>	3.43	3.03	2.03	2.03
<i>VIIA</i>	2.80	3.60	1.60	2.50
<i>VII B</i>	2.93	.....	1.70	.....
<i>VIA</i>	2.60	2.37	1.27	1.20
<i>VIB</i>	2.30	.....	1.07	.....
<i>VA</i>	1.87	1.97	0.77	0.77
<i>VB</i>	1.75	1.77	1.33	1.00
Average	2.61	2.83	1.50	1.77

Our next step may be to bring together the general results of the data shown in Table IV. This is done in Table V, which shows a progressive retardation of Paducah children with increasingly higher grades. As between whites and negroes the dif-

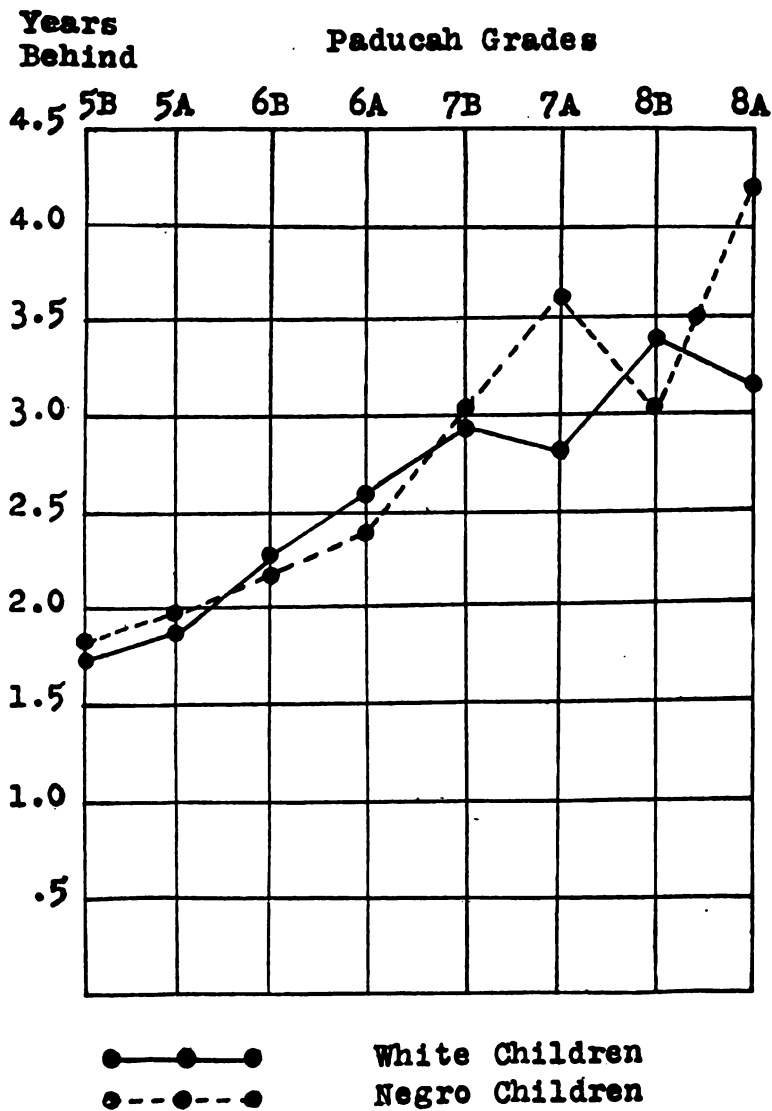


FIGURE 1. SHOWING PROGRESSIVE RETARDATION OF PADUCAH SCHOOL CHILDREN IN ARITHMETIC AS DETERMINED BY THE CLEVELAND TESTS. RETARDATION IS GIVEN IN UNITS OF A YEAR'S PROGRESS. ST. LOUIS STANDARDS USED

ferences in favor of the former are greater in the higher grades. In grades v and vi combined the two races are on practically equal terms. In grades vii and viii combined the negroes fall short of the whites by 0.49 of a year according to the St. Louis standards and 0.65 of a year according to the Grand Rapids standards.

Figure 1 shows graphically part of the comparisons given in Table V. It is arranged in the ascending order of the grades to show that the retardation gradually and regularly increases with years of training in the system.

It is to be understood that Tables IV and V, and Figure 1, are constructed on the assumption that the tests all have equal weight in determining the general status of the schools in arithmetic; that is, that the extent of retardation in each grade in terms of yearly progress may be found simply by averaging the deviations from the norms in each of the fifteen different tests. No special weighting was given any one of these tests. While some of them are, of course, harder than others—on some tests, indeed, the children in the lower grades did not make any score at all—it has been thought fair to find grades in the other school systems, making scores equal in each test to those of the several grades at Paducah, and to make our comparisons on this basis. It seems fair, in other words, to call a grade in one school system equal to a lower grade in another if the two grades actually do, under uniform conditions, the *same* amount and quality of work. In the fundamentals of arithmetic, we may then conclude, the schools here used to illustrate our methods are seriously behind the standards of representative American cities, so far as rapidity and accuracy in the fundamentals are concerned. This deficiency is clearly shown to be general throughout all the schools and grades. In grades iii, iv, and vb the extent of the deficiency cannot be exactly measured, because these grades fall below available standards in some of the tests used. The general status of the schools is clearly indicated in Figure 1, which shows that the retardation is greatest for the higher grades and that it decreases as we go down the grades. This is as we should expect, if the causes of the deficiency are general in the schools; for these causes will have operated more years in the higher than in the lower grades. If the native ability of the children in this system is on

the average comparable to that of the children in the cities used for comparison—and for this assumption we have supporting evidence from a mental test—the difference in median scores should be negligible at the time of beginning arithmetic work in the schools. For simplicity, Figure 1 represents graphically the comparison with only one other school system, but it is evident from Table V that the school studied is seriously behind reasonable norms.⁴

The suggested method of handling the data of the fifteen Cleveland tests shows in a simple, convincing manner the general status of the schools as regards the fundamentals of arithmetic; and it is also capable of showing in any degree of detail desired by professional educators the work of different grades and schools in any phase of the processes emphasized by these tests. One grade in a certain school may, for instance, be found to be comparatively normal in the very simplest forms of the fundamental processes, and yet seriously deficient on such phases of these processes as adding long columns, subtraction with borrowing, estimating the probable number of times one number is contained in another, etc. It is certainly important in surveys that just such diagnostic features of school work be brought out in a way available for the experts who are to correct the defects shown in the more general graphs for the non-technical reader. If such necessary data are furnished in the report, the professional educators concerned can work out for their special purposes and needs such additional graphs and tables as they desire.

⁴ It is but fair to add here that the Paducah schools, used in our illustration, were tested at a time when the disturbances from influenza were to be reckoned with, but there is no satisfactory evidence that the status of the schools would otherwise have been noticeably different from that shown in the report. The general spirit of the directors of the schools was, fortunately, such as to remedy the defects as soon as possible. Important steps to this end were taken as a result of the survey.

Editorials

PRACTICAL VERSUS PURE RESEARCH

Pure research is a term used to describe the investigation of problems whose selection is based primarily on the individual interest of the investigator and whose solutions need have no value as direct influences upon human conduct. An investigator in the field of pure research has to account neither for the source of his problem nor for his solution—except that the solution must be arrived at in accordance with the rules of the game in his particular field. His justification is adequately based upon the fact that the human mind is permitted to expend its energies upon any undertaking which is conceived and carried on in the spirit of pure research. That the results obtained may later be turned to use by other agencies in influencing conduct does not detract from the spirit of such research. Many of the principles of electricity which are now used in the operation of public utilities and domestic flatirons were discovered by scientists who did not foresee their practical applications. Or, if dimly seeing, they investigated merely for the love of discovery.

Practical research, on the other hand, is a term used to describe the investigation of problems which spring from the difficulties of human conduct and whose solutions are evaluated in terms of their efficiency in improving conduct. The beginning and the end of practical research reside in conduct. It begins with faulty practice and ends with the improvement of practice. Such problems as those of educational measurements rise as practical research problems out of the practices of the schoolroom when teachers are unable to determine in objective terms the ability of their pupils and the effectiveness of their methods, or when administrators are unable to judge of the relative efficiency of their teachers. The value of educational measures is judged absolutely by their effect upon school practices as shown in accurate measures, improved methods, and exact evaluation.

Bureaus of educational research are agencies of practical rather than of pure research. The members of their staffs are not justified in selecting any problem through mere individual preference. The problems must be found in the operations of the school, and the solutions are neither complete nor valid until they have affected school practice to its advantage.

In both of these respects, the bureaus are frequently at fault. Their problems are sometimes chosen without regard to institutional importance and the solutions are not carried to such lengths that they can be used in practice. At other times, and much more frequently, their problems are well chosen but the solutions are not perfected with the degree of adaptation necessary for use.

For instance, during the last five years, educational tests have been widely given by bureaus. It has been discovered and shown in numberless tables that some children attain greater efficiency than others and that some classes are superior to others. The amount of labor involved in giving and tabulating the tests has been enormous and frequently the distress of the teachers has been acute. In many cases the morale of the instructional staff has been injured and the reputation of the bureaus as service agencies has been ruined. The teachers feel the true facts of the case. Such bureaus have not been constructive because they have not improved practice; they have taken only the first step and found the problem. When they have put their hands to the plow, they have stopped in the furrow before the task was complete. Practice is no better than before except in so far as the urge of fear has driven the teachers to improve methods whose inferiority is evidenced by the poor showing of their students. The bureau's solution is not complete until it has both pointed out the weakness of the methods and collected new methods or disseminated old ones and has seen that the technic of using them is known. When practice has been adequately improved, then and not until then is the research bureau's work complete.

Or, to take a very simple case, a child is sent to the bureau for mental examination because his work is not satisfactory. The tests being given, an unfavorable report may be made to the principal. But the bureau's task is not complete if the child is returned to the same environment and nothing is done. Practice has not been improved. There yet remains the question of what

to do with the case. This may lead to a long campaign for special rooms for defectives, or to the quick decision to place this defective in a school for his kind or to put him in a class more nearly fitted to his capacities. But in any case the urge to see the task carried to the end must not be weak; it is strong enough in good bureaus to keep pressure applied persistently and diplomatically until something is done.

This means that the members of the staff cannot be mere specialists who are satisfied with reaching an abstract solution. They must have intimate knowledge of the workings of the school system so that their recommendations can be applied without material modifications. For in the event of failure to do something, the administration cannot be blamed except on the proven grounds of laziness. The bureau will be wise if it assumes that the fault is its own because its solutions are not practical and as such do not fit into the educational situation.

So important is the difference between the standpoint of pure and practical research and so easy is the acceptance of incomplete practical solutions that a statement of certain rules of procedure in practical research is undoubtedly worth while. Of these five may be mentioned.

First, *study the operations of the school to discover the points at which they are failing to function efficiently.* This study may be in the form of the occasional formal survey which reveals difficulties as they appear to imported experts. Or it may be the sort of study which is carried on incidentally by the superintendent and supervisors who can from long experience place their fingers upon the weak points of the system. Or it may be the result of investigations carried on by the bureau itself. But in any case the bureau should have at its command a picture of the system at work and a list of the points at which it fails to function with efficiency.

Second, *select and define a problem for investigation.* In the selection of the problem three factors enter. First, other conditions being neutral, the most important problems of the system should be selected. Second, the resources of the bureau are, also, a determining factor; for large investigations cannot be undertaken with an inadequate personnel. Third, the time element must likewise have weight, because confidence in the work of the bureau is dependent upon fairly frequent solutions of some prob-

lems while others of greater magnitude are pending. To these may possibly be added the individual preferences of the staff as a fourth factor, but this is not deserving of serious consideration except in the selection from among several problems, each equally appropriate from the more worthy points of view. The definition of the problem follows as a matter of course as part of the process of investigation.

As an illustration of the rules, I shall describe the development of an investigation with which I am rather intimately acquainted. In 1915, Superintendent Cammack of Kansas City arranged for the selection of language and grammar as a problem for study. He did so because he recognized from his long experience that the language situation was serious in a large and cosmopolitan community such as Kansas City. Moreover, the time element was not prohibitive, and the investigation was not larger than could easily be conducted by one investigator with a few assistants. The definition of the problem resulted in the decision to find what grammar would be taught if it were based on the errors of school children with the aim of teaching only those rules of the subject which were broken and the definitions necessary to understand the rules.

The third rule follows naturally: *using the defined problem as the central element, proceed to its solution.* This is essentially a laboratory process. The problem is temporarily taken out of its setting in the practical operations of the schoolroom, the literature is canvassed, subordinate studies are made, experts are consulted, and a solution is reached which it is hoped will, when applied to the schools, improve instructional practice. While this procedure is being carried on, constant regard for practice is necessary in order to check up the trend of the solution and the form it will finally take. If the solution will not work in practice it must be discarded for another that will. As a result of this constant consideration, the solution finally accepted may be quite different in form and principle from that which was originally contemplated. Preliminary studies must often be tried out in a small way to discover defects before proceeding to a comprehensive attack. But finally the solution which satisfies the demand of the defined problem will be obtained.

Reverting to our illustration, we observe that many of these processes were followed. The oral and written errors of the

children were collected by the teachers. The oral errors were classified. Samplings of written material were read and the mistakes tabulated. Errors in technic were corrected. Definitions necessary to understand the rules were determined. The material was systematically arranged and comparison of this material with that in the adopted textbook of the city was made. Finally, the findings were printed in a bulletin and given to the teachers.

At this point it seemed at the time that our job was completed. We had published. But school practice had not been improved, and additional steps were therefore necessary.

This leads to the fourth rule. *Install the solution in the practice of the school.* This is absolutely essential if practice is to be bettered by the work already done. Publications, charts, statistics, and exhibits do not, of themselves, mark the end of an investigation. They would be an adequate justification of pure research, but in practical research the final test is found only in the improvement of practice.

Installation is the Waterloo of many investigators. While they are solving the problem in the laboratory, they are dependent only upon their own efforts; but when they begin to install, they must reckon with the peculiarities of people. These people may lack the training necessary to use a solution too highly technical. Deep-seated prejudices may be encountered. The program of studies, the textbooks in use, the available supplies, and the crowded character of the curriculum may all have to be taken into account. The hasty investigator may grow irritated at these conditions and blame the system, the board, the superintendent, and the teachers. The wise investigator, however, considers all these factors and presents a solution which will work rather than one which suits him. Or, if he has failed to foresee all the difficulties, he is cheerfully willing to make the adaptations necessary to produce a practical solution.

This does not mean that at times the bureau should not stand for its own solutions against the opinions of the rest of the system. Such situations constantly arise. But it does emphatically mean that the bureau must sell its idea to the instructional and administrative staffs if it hopes to put them into operation. Modification of non-essentials must usually be made if the essentials are pre-

served. Fortunate is the man who finds his methods are accepted and used without modifications. Cooperation is as necessary as a good solution if effective use is to be made of the findings. Since teachers and administrators must apply the solution in order to improve practice, a practical solution is valueless if it is not used. Thus, we find conferences, committees, and educational campaigns to be necessary factors in installation. While this sort of work is distasteful to many investigators, it is an absolutely necessary part of the work of a bureau; and no one incapable of, or uninterested in, getting the cooperation of the personnel of the schools is justified in being on the bureau staff in any other than a clerical capacity.

In the case of the grammar study, we thought at first that with the publication of the report our work was completed. But it soon became evident that the teachers merely read the report without making use of it. A number of factors at once emerged. Not all the staff of seventh- and eighth-grade teachers accepted our basis for the selection of the content of grammar. The textbook in use, which could not be changed, used another basis. If the report was adopted and certain parts of the text were left out, the exercises which followed the omitted portions might occasionally depend upon them.

As a result of these conditions a committee composed of high-school teachers and grammar-grade teachers, selected by the teaching force, met frequently and discussed the proposition with great frankness. As a result the report was adopted, the textbook was thoroughly edited and portions omitted, together with later exercises dependent upon these. This was then referred to the grammar-grade teachers, and the report was adopted by all. The changes made necessary in the text were printed and distributed.

Obviously, a much better solution would have been the publication of a grammar text which carried out the plan of the report; but it was necessary for us to reach not the best solution so much as one which in view of all the conditions would work.

The installation advances the solution one step but it does not end the matter. Although practice may for a time be improved, the improvement may turn out to be merely temporary. Therefore, the fifth rule is necessary: *provide or utilize machinery*

for the supervision of the solutions. The bureau is concerned with the permanent improvement of practice, and this can be obtained only by supervision. Mere inspection is frequently sufficient, but in many cases the teachers must be instructed in the best methods of operating the solution.

This means that while the bureau does not take on the duties of a supervision, it must see that supervision is maintained and keep close watch on the operation of the solution until it has become an integral part of school practice. Its duty is not so much that of inspection as that of constructive assistance in ironing out difficulties of adaptation to obstructive conditions or to conditions not foreseen until the operations were under way.

Reverting to the grammar study, this fifth step was not taken in any formal way. The process of supervision is long continued. The cost and inconvenience of traveling a long distance made it difficult to follow the process of supervision. But while nothing formal was done, the subject received the same supervision from the supervisors as did the other subjects of the curriculum.

It is a detail of administration as to whether the fourth and fifth steps should be carried on by the bureau or by some other agency in the system. In some cases the superintendent or the supervisor would be better able to install; in others, the bureau would be the logical agency. But in either case, the job is not completed until practice is permanently improved. Therefore, bureaus of educational research owe it to their own reputations for efficiency and service to see that the task is not forsaken until their results have become a part of the regular practice of the school.

W. W. C.

EXCUSE ME !

In Dr. Chapman's article on "Group Intelligence Tests Without Prepared Blanks" in our December, 1920, number, the footnote was ambiguous. It should have read, "Copies of this test may be secured in any number at twenty-five cents ~~PER~~ COPY, on application to the author at the Department of Education, Yale University." The words "per copy" were omitted in error. Some literal minded people have been ordering large quantities of the test, believing that they would receive the entire shipment for twenty-five cents. Each copy of the test is twenty-five cents—and worth the money.

EDITOR.

Reviews and Abstracts

E. H. CAMERON, *Editor*

EVENDEN, E. S. *Teachers' salaries and salary schedules in the United States, 1918-19.* Washington: National Education Association, No. 6 of series of Commission on the Emergency in Education, 1919. 169 pp.

A review of this report now necessarily differs greatly from a review at the date of publication, October, 1919. The writer was not asked to undertake the review until the fall of 1920 and other duties have prevented the writing until January, 1921. But so valuable is the report that even at this date a review is thoroughly worth while.

A book review for readers of the JOURNAL OF EDUCATIONAL RESEARCH should in the writer's judgment answer these test questions which are given in order of importance to the reader:

1. What are the essential results of the investigation that are of importance to readers of the Journal?
2. What classes of readers should read the book or purchase it for their school or personal libraries?
3. Did the educational problem treated merit the time, energy, and ability of the investigator expended upon it?
4. How nearly did the work, as to the territory covered and methods employed, solve the problem for which the investigations were undertaken?
5. What methods of investigation, presentation of results and circulation of results, would be useful in similar investigations?
6. What further investigations of importance in the field covered by this investigation does it leave to be done?

1. Many readers of the Journal have already seen the report and so have formulated answers for themselves to the first two questions. Furthermore, they have in many cases seen summaries or extracts from it in various national and local educational periodicals as well as in the lay press. A considerable number have doubtless assisted in making these summaries or have used the book in conducting local salary studies. But for those who are not thus familiar with it, for students of education who are preparing for administrative positions, and for clearness in this discussion, a birdseye view is desirable.

The report was planned by the Commission on the Emergency in Education, of which Dr. G. D. Strayer was chairman. The data was secured by questionnaires in the early part of 1919 and the report itself was prepared mainly by Dr. E. S. Evenden. Data were collected from some 382 cities of all sizes, representing all kinds of economic and social conditions in all parts of the country, and from 10 county school systems.

The superintendents filled out questionnaires on the distributions of salaries, on salary schedules, on current salary standards, and on the cost of living in their respective communities. Some 15,000 teachers in these same school systems also filled out questionnaires, giving their personal data on such of the items as affected them. State superintendents of public instruction supplied statements of the general salary situation in their own states. A fourth section of the report deals with teachers' salaries and the cost of living and compares the salaries of teachers with those in similar occupations. The final section deals with the present situation on teachers' salaries, lists elements to be considered in making such schedules, suggests a standard salary schedule for the whole country, gives advice on how to administer such a schedule and concludes with some pertinent observations on the problem of arousing public interest in teachers' salaries. The conclusions are conveniently summarized in point form for each main section. This is a thoroughly workable form but one which does not easily lend itself to a convenient brief digest here.

2. Any school board member, any school executive or any future school executive, who aims to keep abreast of the times educationally, must devote much time and energy to the crucial matter of teachers' salaries. No such person can afford to work without a copy of this report in the school library. Any school executive or any future school executive will have great difficulty in procuring more value for his professional library from \$1.50 than by investing that amount in this report.

3. In early 1919 few if any educational problems were more important than finding out the true salary situation in the United States and ways of keeping intact at least skeleton staffs of competent teachers. It was a real emergency in education. Possibly the study of ways of securing more money for schools was of greater importance just then. But even this is debatable since it is practically impossible to secure more money for public schools unless there are at least enough capable teachers to demonstrate clearly to the taxpayers what the latter are expected to raise more money for. The problem was worthy of the conspicuous ability and best efforts of the commission that dealt with it. Indeed it deserved the undivided attention of a much larger group of equal caliber. It fully merited the eight months devoted to it by the man of recognized competence who shaped it for effective presentation to the teaching profession and friends of education throughout the country.

4. The investigation aimed to set standard salary schedules for all grades of teachers for various parts of the country and sizes of cities. It aimed to check up the validity of these standards by securing the facts as to salaries paid teachers, by determining the salaries actually necessary to maintain teachers at reasonable efficiency, by taking into account the trend of the times as seen by the most competent judges (the state superintendents) of conditions over large areas; and by determining what salaries would be necessary to attract capable talent in competition with other occupations. It also aimed to give as accurately as possible a desirable salary schedule applicable to city systems throughout the country and to show city school systems how to enact and operate a desirable salary schedule. All of these aims are markedly achieved in the report.

5. The report will serve admirably as a model for committees investigating salaries in any section of the country, whether in a state or in a smaller area. It points out the different phases to be studied, it shows how the data should be assembled it is full of

valuable suggestions for effective presentation to the public, and its questionnaires may be readily modified for use in local areas.

In addition it has numerous minor conclusions that will suggest elaborations of particular phases of a salary investigation to investigators where such phases constitute particularly acute problems. Thus a normal-school president will derive stimulus from finding on page 98:

Few states have a salary schedule for their normal schools which will bear comparison with the salaries in the better high schools of the State. As a nation we spend as much per student per year to educate any high school pupil or any boy in the reform school as we do for the training of a teacher in a normal school. We spend nearly twice as much for a pupil in a deaf school, more than twice as much for a college university student, three times as much for a blind student, and nearly four times as much for the training of a feeble minded child.

Anyone interested in combating a plan to employ mainly teachers who are partially supported by their parents, or in securing more men teachers for a given system, will find valuable data and suggestions on pages 76-77. Any superintendent or school board ought to take fresh courage from this on page 132:

The above study would conclusively indicate that this question of increases to teachers' salaries is largely a matter of local progress, and depends more upon the development of a favorable community attitude or upon the aggressive work of a superintendent or teachers' organization, than upon any economic development of the community. Such a study is evidence of the oft-quoted statement that a community will find the means of supporting schools when convinced that it is a desirable thing to do.

The suggested standards in the table on page 148 as well as the data on actual salaries in 1919, have increased value because of the present nation-wide financial stringency. We are now back to where the 1919 figures represent current conditions more accurately than they did in 1920.

6. The investigation leaves practically untouched the salaries of rural teachers and thus does not directly treat the salary problem as it affects the majority of teachers in the country. But this phase could not have been adequately treated in the time available. Furthermore the variations and allowances for local conditions are much more troublesome to handle for rural teachers. Then too rural salaries have been vitally affected by the draining off of rural teachers to city schools even faster than formerly. Increases in salaries for city teachers have increased rural salaries through increased competition for the better rural teachers. The commission greatly aided rural salaries by its report even if it did not study them directly. And it wisely confined its efforts to what could be adequately studied and reported in time to be of actual value. Aside from this matter of rural salaries, the report leaves little of importance undone. Of course as general conditions change, similar reports will be desirable in the future.

Inquiry No. 1 of the *Know and Help Your Schools* movement conducted by the National Committee for Chamber of Commerce Cooperation with the Public School and by the American City Bureau is such a report and brings the figures up to the summer of 1920.¹

CARTER ALEXANDER

Wisconsin State Department of Public Instruction

¹ Published by American City Bureau, New York, Chicago, San Francisco, and Toronto.

VAN WAGENEN, MARVIN J. *Historical information and judgment in pupils of elementary schools.* (Teachers College Contributions to Education No. 101) New York: Teachers College, Columbia University, 1919. 74 pp.

Van Wageningen has devised seven scales. Information A, Information B, Thought A, Thought B, Character A, Character B, and Character L. The A and B scales appear not to be exactly equivalent but are intended to be used as duplicate forms. Each of the scales consists of a series of exercises arranged in order of difficulty as determined by the percent of correct responses obtained by submitting them to pupils in grades four to eight. The pupil's score in each case is the number of correct responses.

The author states that "the chief desiderata in instruments for measuring achievement in American history are (1) that the tasks be symptoms of important abilities really desired by the school; (2) that the tasks be not too much disturbed by linguistic difficulties so that ability in history, not in reading or composition, may be chiefly measured; (3) that the measurement of a small group, such as a class of twenty-five or more, be made with sufficient precision; (4) that the tests be capable of extension to alternative forms so as to reduce the harm done by special preparation or coaching for the tests; and (5) that the administration and scoring of the tests be convenient."

The author states that he is leaving the reader to judge for himself concerning the fulfillment of the first two of these requirements. Nowhere in the monograph does he give any account of the construction of the exercises. Usually in making such a group of tests the author finds that it is necessary to reject a number of exercises that have been constructed because they do not yield satisfactory responses when submitted to pupils. Presumably Dr. Van Wageningen must have had this same experience. It is unfortunate that he does not tell us the way in which he arrives at the particular exercises which constitute his tests. One writer² has pointed out that a number of the exercises in the thought scales appear to call for factual information. To the extent to which this is true the thought scale is simply another information scale. Thus it is doubtful whether the first two requirements have been satisfied.

The author shows that the other three requirements are met by these scales. The coefficient of reliability, using pupils of the same sex and grade, are 0.71 for information, 0.74 for thought and 0.83 for character. The probable error of these coefficients is given as ± 0.01 . The mean square error of a pupil's score is approximately 0.7 for the information and thought scales, and 0.6 for the character scales.

In addition to the derivation of the scale the writer investigated grade, age, and sex differences. The usual individual differences were found in the case of grade and age. In the case of sex differences boys were found distinctly superior to girls.

The general plan of the construction of these scales in that which has been used by Buckingham, Trabue, Woody, and others. The work of Dr. Van Wageningen, therefore, exhibits no originality in this respect. However, if this plan of scale derivation is accepted, as it apparently is, there is no opportunity for originality. As stated above the author fails to tell how the particular exercises of the scales were selected and therefore we cannot know whether there is any originality in this phase of the work or not. So far as one may judge from the published scales this seems doubtful.

W. S. M.

² Buckingham, B. R. "A proposed index of efficiency in teaching United States history," *Journal of Educational Research*, 1:161-71, March, 1920.

BETTS, G. H. *How to teach religion: principles and methods*. New York: Abingdon Press, 1919. 223 pp.

There is a growing movement in America toward better methods in religious education. The Protestant churches are waking to the weakness of the policy which relies upon preaching to the neglect of teaching, and undertakes the conversion of adults rather than the Christian nurture and education of children. It has become clear, moreover, that the very magnitude and efficiency of our system of public education may operate, because of its omission of religious teaching, to discredit religion in the minds of the young. If education and religion are not ultimately to be divorced, the churches must assume responsibility for the religious education of children with something like the same clarity of purpose, soundness of method, and efficiency of organization that should characterize the work of the public schools.

The past twenty years have witnessed the introduction of graded lessons into the Sunday schools and the gradual displacement of the old uniform lesson system whereby the same material was taught to children and adults of all ages. The churches are coming to realize, moreover, that the religious education of children involves not merely instruction but activity, and they have begun to match the project methods of the public schools with plans for the comprehensive, motivated education of children in the problems and principles of Christian living. With this has come a rapidly growing demand for week-day religious instruction, and in many communities the public schools are now affording to the churches for this purpose one or more hours a week from their schedule. Many churches now pay some of the teachers in their Sunday schools, and employ directors of religious education, who give their full time to the supervision of the church's plans for the education of its children, young people, and adults. Theological seminaries generally have instituted departments of religious education in which students are trained for the educational aspects of their future work as Christian ministers.

Professor Betts, who was for many years the head of the department of psychology and education at Cornell College, two years ago accepted a professorship of Religious Education in Northwestern University. This book is the first fruitage of his labor in this new field.

All good teaching, Professor Betts holds, rests on a four-fold foundation of principles: those concerned with the aims of teaching, the material or subject-matter of teaching, the organization of the curriculum, and the method or technic of instruction. He discusses "how to teach religion" from each of these four points of view. He defines the aim of religious teaching in terms of knowledge, attitudes, and conduct; and devotes successive chapters to the consideration of what religious knowledge is of most worth, what religious attitudes are to be cultivated, and how religious knowledge and religious attitudes may be used to shape the conduct of daily life. There is a chapter upon the evaluation of materials, biblical and extra-biblical, including materials drawn from nature, history, biography, art, and music. In a chapter on the organization of material there is a brief discussion of the principles underlying the construction of a curriculum of religious education—the problem to which Professor Betts with his graduate students is particularly devoting himself. The last four chapters of the book discuss methods of teaching religion with all the concreteness and insight which have been characteristic of Professor Betts' discussions of like problems of method in the public schools.

Readers of the author's former books, especially "The Mind and Its Education," "The Recitation," and "Social Principles of Education" will expect just the fresh, vigorous, concrete treatment, sound in principle, which is here afforded. Now and then there is evidence that he is at work in a field comparatively new to him. Occasional slips, such as attributing the Epistle of the Hebrews to Paul, show that the author is not as well trained in Biblical literature and theology as in psychology and pedagogy. His criticisms of existing curricula, while for the most part sound, do not bear the marks of actual classroom experience with this material. Professor Betts is not writing for theologians, however, or for lesson-writers, but for the great body of those who teach religion. On the whole his book is the best that we have in its field, and is a very welcome addition to the church's resources as it faces the problem of how to make religion an effective part of the education of children.

L. A. WEIGLE

Yale University

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Walter S. Monroe, University of Illinois, Urbana, Illinois.

The conference on educational measurements held annually by Indiana University will take place this year on Friday and Saturday, April 22 and 23. Mr. S. A.

Courtis of Detroit will give three addresses before the conference, Friday morning, afternoon, and evening. Dr. Charles H. Judd of the **Indiana** University of Chicago will address the conference on Saturday morning **Conference** and afternoon. Reports of the discussions will be contributed by members of the Indiana University faculty of the School of Education. This is the oldest and also one of the best known conferences on this topic. The speakers secured for this year insure the usual degree of excellence of the program.

Within the last few years a number of university normal schools have established departments, which are given some such titles as "Bureau of Educational Research" or "Bureau of Educational Measurements." In some instances the function of such an organization is considered to be primarily that of research. This **Extension** research is to be carried on in cooperation with the school men of the **Service of** state and frequently is based upon problems which are suggested by **Research** them. In other instances the major function of the organization of the **Bureaus** department has been considered to be that of instructing superintendents, principals, and teachers in the use of educational tests and other scientific methods. This has been done by regular extension classes and by conferences. Recently this department received an account of some of the work which is being carried on this year by the Bureau of Educational Measurements and Standards of the

Kansas State Normal School, Emporia, Kansas. Since this is one of the oldest of such organizations it is interesting to note this statement by the director: "We have given the National Intelligence Test to the children of the elementary schools of Junction City, Fredonia, and Clearwater. Next week we shall give them in Holcomb and Cimarron. Extension classes are being conducted in three centers. We have had more calls for assistance of this type than our force will allow us to handle. Next year we hope to have one man give his full time to field work."

This plan was indorsed at the City Superintendents' and High School Principals' Sections of the Council of Administration, January 20, 1921. It includes both a definition of school marks and a definition of the distribution of these marks. The plan represents an attempt to make more scientific and accurate the marking of high-school pupils. The plan has been in operation in a number of high schools in Kansas for sometime. The indorsement does not make obligatory the use of the plan but no doubt it will be adopted by a large number of high schools in the state. The plan was formulated by a committee of which W. W. McConell, principal of the high school, Neodesha, Kansas, was chairman.

DEFINITION OF GRADES

GRADE OF A

1. Scholarship—Exceeding expectations of instructor.
2. Initiative—Contributions exceeding the assignment.
3. Attitude—Positive benefit to the class.
4. Cooperation—Forwarding all group activities.
5. Individual Improvement—Actual and noticeable.

GRADE OF B

1. Scholarship—Accurate and complete.
2. Initiative—Stimulating some desirable achievements.
3. Attitude—Proper and beneficial.
4. Cooperation—Effective in group work.
5. Individual Improvement—Showing marks of progress.

GRADE OF C

1. Work in general of medium quality.
2. Work quite strong in one or more items but weak in others.

GRADE OF D

(This grade might be produced by any variety or combination of weaknesses as the definition suggests.)

1. Scholarship—Barely meeting assignments.
2. Initiative—Uncertain, not usually manifest.
3. Attitude—Not objectionable, usually neutral.
4. Cooperation—Not positive nor very effective.
5. Individual Improvement—Slight, not positive.

GRADE OF F

1. This is a failing grade and since it may result from any number of weaknesses is not defined.

DISTRIBUTION OF GRADES

This is a very important factor of this system of grading. Within the class and within the school it is expected that a proper respect be paid to the normal curve of frequency. However, the grades are not to be made primarily for the purpose of fitting the curve. The curve is to be used as a check to see what the "norm" should be under usual conditions and with large enough group. It is expected that a teacher be able to justify his variation in grade distribution from the normal curve of frequency.

NORMAL CURVE OF FREQUENCY

The curve is built upon the following percentages: A—7%, B—24%, C—38%, D—24%, F—7%.

FUNCTION OF THIS SYSTEM

With this code a teacher should grade carefully and be able to defend every grade given. It should be pointed out to the student with a low grade that he is falling short of the standard in some one of these valuable qualities. Teachers have long felt the need of definite points of defense when questioned about a grade but these five desirable qualities need emphasis and should be used in conferences with students. It is essential that students understand this system as thoroughly as do the teachers. This will give students a secure sense of direction in attempting improvement.

In this grading system teachers should bear in mind that grades are given on a comparative basis only; every student's work is to be compared with that of every other student with whom he works, and grades are to be arranged according to his ranking in the class. This will apply to every point under the "definition of grades" as scheduled above. In no case is any grade to be translated to or thought of in terms of percents, but students are to learn that if they make A or B grades, they are considered to belong to approximately the upper one-third of the class; if they are C students, they belong to approximately the middle one-third of the class; and if they rank below C they are among approximately the lower one-third of the class.

WEIGHTED CREDITS

(Suggested by the committee but not recommended unless it received the sanction of the state department)

1. Grade of A for unit subject, 1.2 units.
2. Grade of B for unit subject, 1.1 units.
3. Grade of C for unit subject, 1 unit.
4. Grade of D for unit subject, 0.9 unit.
5. Grade of F for unit subject, no credit.

Training Teachers to Use the New York City Penmanship Scale

Our readers will remember the article by Mr. Nifenecker on "Grade Norms for the New York City Penmanship Scale," which appeared in our December, 1920, number. The Bureau of Reference, Research and Statistics, of which Mr. Nifenecker

is director, has lately succeeded in making up sets of practice material for teachers to use in training their judgment of handwriting by the use of the New York City Penmanship Scale.

This practice material consists of two series of facsimile samples, each series consisting of twenty samples. In addition to this there is a third series of twenty samples which is used as a test series. The two practice series are used in the following manner: The principal distributes a practice series (Series A) to his teachers. The teachers then rate the samples of this series against the scale, taking account of form, movement, and spacing. After the teachers have done this their results are checked by the principal against the known values of the samples which have been furnished to him. A conference with each teacher ensues during which the greatest variations from the standards are taken up. Again the teacher, using the practice series, will rate the samples against the scale. This procedure is carried on until the teacher's variation from the established values of the samples has been materially reduced. As a final check on the accuracy of the teacher's judgment the test series of samples is used.

As has been indicated above, an alternative practice series (Series B) is also provided. It is to be used when familiarity with the A series has made its further use undesirable.

This follow-up of the New York City Penmanship Scale on the part of the Bureau of Reference, Research and Statistics constitutes a fine example of carrying through a research project to the point not only of installation but also of supervision.

Correlation of Certain Intelligence Tests for the Lower Grades

In these columns of a recent issue of the Journal appeared a discussion of the Illinois General Intelligence Scale based upon data furnished by Superintendent L. W. Keeler of Michigan City, Indiana. From the same source the Bureau of Educational Research has also received scores of a number of lower grade pupils on several tests. About 20 pupils in the first grade, an equal number in the third grade, and 35 in the second grade were given the Stanford Revision of the Binet-Simon Tests, the Dearborn Group Tests of Intelligence, and the Kingsbury Primary Group Intelligence Scale. For purposes of correlation the mental ages in months on the first mentioned, the average point scores on the second, the point scores on the last, and the average of these two latter scores were used. Throwing the scores for the pupils of the three grades together, the following coefficients were obtained:

Stanford with Dearborn.....	0.87
Stanford with Kingsbury.....	0.73
Stanford with Average.....	0.87
Dearborn with Kingsbury.....	0.75
Dearborn with Average.....	0.92
Kingsbury with Average.....	0.89

Assuming that the Stanford Revision is a standard for group intelligence tests, these figures imply that both the other tests are rather accurate, the Dearborn being so to a high degree and as good as the average of the two.

The correlation coefficients for the three grades separately were also computed. They were:

	GRADES		
	I	II	III
Stanford with Dearborn.....	0.66	0.78	0.60
Stanford with Kingsbury.....	0.32	0.53	0.60
Stanford with Average.....	0.61	0.71	0.66
Dearborn with Kingsbury.....	0.53	0.54	0.47

These coefficients indicate that the superiority of the Dearborn Test is with the younger pupils, but that later it possesses no advantage over the Kingsbury.

However, the matter may be looked at from another viewpoint. The following table gives the means, medians, standard deviations and coefficients of variation (Pearson's formula).

	GRADES			GRADES CONTINUED
	I	II	III	
	<i>Medians</i>			
Dearborn.....	28	44	59	43
Kingsbury.....	21	30	53	30
	<i>Means (Averages)</i>			
Dearborn.....	27	44	59	43
Kingsbury.....	22	32	59	36
	<i>Standard Deviations</i>			
Dearborn.....	9.7	12.8	10.0	15.9
Kingsbury.....	6.2	16.3	21.3	20.5
	<i>Coefficients of Variation</i>			
Dearborn.....	36	29	17	37
Kingsbury.....	28	51	36	57

Since the two tests are both scored on a scale of 100 points and the distributions obtained in the two are located not far from the same portion of the scale, standard deviations and coefficients of variation seem to indicate that in grades II and III, the Dearborn Tests are suitable for testing a group of greater range of ability than is the Kingsbury Scale, but that the latter is scored in smaller units and hence discriminates more finely. In grade I the reverse seems true. The increases from grade to grade, which, as judged by the Dearborn, are almost equal, while by the Kingsbury that from grade I to II is less than one-half of that from II to III, also point to this conclusion.

There is another possible interpretation of the data given above, however. Other things being equal, the greater the accuracy of a test the less its variation. Though our data are not sufficient to say that all other things are equal, yet since both tests cover a range of 100 points and the averages of the distributions are fairly close to each other, these facts furnish some evidence that the Dearborn is the more accurate in the two upper grades, and the Kingsbury in grade I.

On the whole, the evidence obtained from the coefficients, both of correlation and of variation, and from the increases in score from grade to grade seems to point to the

fact that the Dearborn is somewhat superior to the Kingsbury for the three grades mentioned. Whether or not this superiority is great enough to justify the at least double expenditure of time required in its administration is a question the writer prefers not to attempt to answer.

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A Method of Tabulating Scores in Group Testing

During the early fall of 1920 the seventh and eighth grades of two Boston schools were given the Dearborn Group Tests of Intelligence. After the tests had been corrected, it was decided that it was unwise to report the results to teachers and administrators in the form of intelligence quotients. It was believed that the chance of misinterpreting such returns by teachers and parents was great enough to warrant seeking some new method of making a report to the school.

After trying various ways of treating the distributions, it was decided that the method described in this communication met all the necessary requirements and made it possible to locate each pupil within certain ranges, which were near enough to actual conditions for all practical purposes.

After the papers were corrected a distribution was made of all scores of each grade tested regardless of age. The median, and the first, and third quartiles of the distribution for each grade were then determined. Following this, a distribution of scores on a basis of age regardless of the grade was made. That is, all pupils were divided into age groups of six months each, 10 years to 10 years, 5 months; 10 years, 6 months to 10 years, 11 months; 11 years to 11 years, 5 months, etc. Then a distribution of the scores for each of these age groups was made and the median, and first, and third quartiles were found. Then a third distribution was made in which the pupils were grouped according to ages. The median age, and the first, and third quartiles were found.

It was now possible to place each pupil in his proper quarter according to each of these distributions and thus to obtain his grade-score, his age-score, and his chronological age (in terms of quarters). Table I and Table II show the way each class was reported to the school. The first quarter shows a high score or high age and the fourth quarter shows low score or low age. Under pupils' names letters have been used instead of names to indicate pupils. This report shows that most of the pupils fell in the first or second quarter of the distribution in both grade score and age score with only one (Z) falling in the fourth quarter. Sixteen are young for their grade as shown by the fact that they are in the fourth quarter and only four are old for their grade as shown by the fact that they are in the first quarter. In other words, this is a superior class.

TABLE I. SHOWING SEX, AGE, SCORE, AND QUARTILE STANDING OF
32 EIGHTH-GRADE PUPILS, ROOM 346

SEX	PUPIL'S NAME	AGE	PUPIL'S SCORE	QUARTILE STANDING		
				Grade Score	Age Score	Age
B.....	A	13-1	68	1	1	3
G.....	B	12-5	66	1	1	4
B.....	C	12-3	64	1	1	4
G.....	D	12-10	71	1	1	3
G.....	E	13-1	61	1	1	3
G.....	F	13-5	72	1	1	2
B.....	G	13-3	68	1	1	2
B.....	H	13-3	72	1	1	2
G.....	I	12-4	65	1	1	4
B.....	J	13-3	61	1	1	2
G.....	K	12	73	1	1	4
B.....	L	12	71	1	1	4
B.....	M	12-4	57	2	2	4
B.....	N	12	58	1	2	4
B.....	O	12-6	78	1	1	4
G.....	P	12-10	81	1	1	3
G.....	Q	12-3	69	1	1	4
G.....	R	11-10	87	1	1	4
B.....	S	12	59	1	1	4
B.....	T	13-3	59	1	2	2
G.....	U	11-11	45	3	3	4
G.....	V	12-7	69	1	1	3
G.....	W	13-10	53	2	2	1
G.....	X	11-11	62	1	1	4
B.....	Y	12-6	69	1	1	4
B.....	Z	15-6	30	4	4	1
G.....	AA	14-2	61	1	1	1
G.....	BB	12-3	55	2	2	4
B.....	CC	12-3	83	1	1	4
G.....	DD	12-11	79	1	1	3
G.....	EE	13-5	51	2	2	2
B.....	FF	13-8	78	1	1	1

TABLE II. SHOWING SEX, AGE, SCORE, AND QUARTILE STANDING OF 40 EIGHTH-GRADE PUPILS, ROOM 347

SEX	PUPIL'S NAME	AGE	PUPIL'S SCORE	QUARTILE STANDING		
				Grade Score	Age Score	Age
B.....	A	14-2	69	1	1	1
B.....	B	13-10	71	1	1	1
B.....	C	13	48	4	3	3
B.....	D	14-2	69	1	1	1
B.....	E	15-1	40	4	3	1
B.....	F	14-3	75	1	1	1
B.....	G	13-5	45	4	3	2
B.....	H	13-9	65	1	1	1
B.....	I	14-5	29	4	4	1
B.....	J	13-8	77	1	1	1
B.....	K	14-2	64	1	1	1
B.....	L	13	46	3	3	3
B.....	M	13-5	57	2	2	2
B.....	N	13-10	25	4	4	1
B.....	O	12-11	35	4	4	3
B.....	P	13-10	37	4	4	1
B.....	Q	12-10	31	4	4	3
B.....	R	14	48	3	2	1
B.....	S	14-11	50	2	2	1
B.....	T	14-2	33	4	4	1
B.....	U	18-3	16	4	.....	1
B.....	V	13-5	41	4	4	2
B.....	W	13-11	20	4	4	1
B.....	X	15-9	47	3	2	1
B.....	Y	15	55	2	1	1
B.....	Z	14-2	56	2	2	1
B.....	AA	13-10	63	1	1	1
B.....	BB	17	31	4	.....	1
B.....	CC	14-1	41	4	3	1
B.....	DD	15-1	41	4	3	1
B.....	EE	13-2	41	4	4	2
B.....	FF	14-7	52	2	2	1
B.....	GG	13-4	39	4	4	2
B.....	HH	14-4	53	2	2	1
B.....	II	14-7	45	3	3	1
B.....	JJ	14-5	49	3	2	1
B.....	KK	12-5	41	4	3	4
B.....	LL	13-6	41	4	3	2
B.....	MM	15-9	49	3	1	1
B.....	NN	13-6	42	4	3	2

In Table II one-half of the pupils fall in the third or fourth quarter of the distribution in both grade-score and age-score, while thirteen attain a score which places them in the first or second quarter. One pupil is young for his grade as shown by the fact that he is in the fourth quarter and 28 pupils are old for their grade as shown by the fact that they are in the first quarter of the distribution. In other words, these pupils are mentally inferior to the children in room 346. If, however, the tests are telling the truth, room 347 is poorly graded as shown by the range of scores from 16 to 77.

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Norms for the Otis Group Intelligence Scale

The norms for the Otis Group Intelligence Scale presented by Dr. Colvin in the January number of the JOURNAL OF EDUCATIONAL RESEARCH cause me some concern. As he mentions, they differ from the norms published by Dr. Otis, but what is of more importance to us locally is that they differ still more from the norms we have derived from local data. The following table shows the differences:

Age	Otis Norms	Colvin Norms	Cincinnati Norms
8	40	58	30(4)
8½	46	70½	36(9)
9	52	67½	42(22)
9½	58	78½	48(66)
10	64	80½	54(67)
10½	70	90	60(91)
11	76	94	66(105)
11½	82	109	72(111)
12	88	118	78(101)
12½	94	119½	84(91)
13	100	130	90(101)
13½	106	133	96(112)
14	112	135½	102(85)
14½	117	134½	108(49)
15	121	136	114(40)

The figures in parenthesis indicate the number of pupils at each age taking the test. Two schools were selected for the testing, upon which these norms are based, by conference with the supervisors. One school was considered a little below average and the other a little above. A combination of the records from both schools was thought to be representative of Cincinnati. Our norms were derived before the final norms of Dr. Otis were published. The work was carefully done and the results have agreed very satisfactorily with Stanford results and with grade placement.

The use of either the Otis or Colvin norms would give us absurd results. We are not inclined to believe that Cincinnati school children are so much lower than other children. The only possible explanation which occurs to us is in the method of giving and scoring. It may not be out of place therefore to mention just how we do our testing.

All of the tests were given by myself and one assistant. The test papers were also scored by us. In the giving, we have been very rigid in following faithfully the printed directions, never varying by way of additional explanation in the slightest degree. We have been equally exact about the scoring, although there is less tendency to vary procedure here than in the giving. Much of our work has been checked, so that we are sure no accidental errors have crept in.

My experience in training teachers to give standard educational tests is that there is an almost irresistible tendency to help a little more than the directions permit. A teacher may read over the directions and believe that a slight change in wording would make the meaning clearer, or think that a certain amount of coaching in taking such a type of test is legitimate. Also, during the test, she has the feeling that the directions have not been sufficiently clear and she adds a word. All of this is possible and likely to happen in more cases than we like to think. The result, of necessity, is to raise the pupils' scores and, if these results are used to make up norms, to raise the norms.

If I am right in this explanation, it is evident that a single set of norms cannot be of universal application. Each locality will have to establish its own norms under the conditions under which it proposes to administer the tests. Granting that our testing procedure could be better standardized, that alone would not help materially unless those who administer the tests could be made to adhere more carefully to the same procedure.

With the rapid increase in testing, are not some very bad and misleading results to be expected unless there is much more care taken to understand the conditions under which the testing is done?

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The Van Wagenen Reading Scales in History, General Science, and English Literature

Although there are now available several reading scales and several standardized or diagnostic tests for measuring reading ability, little attention so far seems to have been given to the measurement of the ability to read and comprehend the content of any particular one of the school subjects. The present series of reading scales is an attempt to meet just this need. With them the teacher of a special subject, such as history, general science, or English literature, will be able to determine how well the individual students of the group can grasp the content of the material assigned for reading and study. Not a few of the failures to do successful work are found to be due to inability to read and comprehend the ideas in the lessons assigned. With the use of such reading scales it may also be possible to determine more adequately than can be done at the present time the abilities of students to take up certain subjects of study rather than others.

Another and equally important value of the scales lies in the possibility of determining the degree of difficulty of reading material that may safely be placed in the hands of students of various degrees of capacity, ability, and maturity with an expectation that the content will be comprehended. Few indeed are the textbooks in use at the present time that are written consistently within the range of comprehension of the students for whom they are designed. Nor could the situation very well be otherwise in the absence of more definite models for each particular stage of achievement.

No less important but less evident is the value of such scales in making possible (1) relatively accurate comparisons of ability in reading in various subjects; (2) relatively accurate measurements of the effects of increasing the student's range of information in a subject upon his ability to read intelligently in that subject; and (3) relatively accurate measurements of the effect of different methods of study upon the ability to read independently in a certain subject.

The unit of measurement in these scales is the deciquartile or one-tenth quartile. The quartile is the amount by which two exercises must differ in difficulty in order that one shall be done with the same degree of correctness by the mid-pupil in a normally distributed group as the second is done by the pupil who stands at the top of the lower quarter of the group or at the top of the lower three-quarters of the group. The deciquartile, or one-tenth quartile, thus represents one-tenth of the difference in reading ability between the median pupil and either the twenty-five or seventy-five percentile pupil in a normally distributed group in reading ability in a special subject like history. Inasmuch as the zero point in reading ability has not yet been adequately determined, an arbitrary zero point has been selected which lies eighty deciquartiles or eight quartiles below the ability of the median first-year high-school student at the end of the year. Although it will not yet be possible to say that one student has one and one-half times as much reading ability in history as another student has, or that he can read one and one-half times as well in history as in general science, nevertheless one can say that one student or one group has made one and one-half times as much gain as another student or group of students. An illustration would be the case of one group making a gain from 72 deciquartiles up to 80 deciquartiles, while a second group made a gain from 72 deciquartiles up to 84 deciquartiles during the same period.

The exercises in the several reading scales were scaled in terms of the quartile by practically the same method as used by the author in making his American history tests. The percents of students of each group taking the original tests—approximately 750 in grades eight to twelve—who did each exercise correctly were found. With the use of the table devised by W. F. Sheppard, these percents were turned into quartile values. The quartile values for the different grades were then referred to the median of the first-year class, which as stated above, was placed at 80 deciquartiles above an arbitrary zero point. The only difference in method lay in the determination of the distances between the group medians. In this study the differences were based on the averages of distances for each exercise instead of on the overlapping of the groups upon one another's medians, as the former method seemed to give a more adequate measure of the grade differences for the reading exercises.

In connection with the derivation of these scales two other facts should be noted. The scales are purely reading scales. No writing other than the making of check marks is necessary. Each exercise, of which there are fifteen in each scale, consists of a

carefully selected paragraph with a list of from four to six statements below it. These statements—which for the eighth grade and high-school student are of approximately equal difficulty within any one set—either contain an idea that is expressed in the paragraph in different words or that can be derived from a reading of the paragraph, or else contain an idea that might be but is not in the paragraph or derivable from it. The student has merely to check those statements which contain an idea that is to be found in the paragraph or that can be inferred from it. All the teacher needs to do in correcting the test papers is simply to note from a key the number of errors made in each set and to write this number of errors in a special form provided for it at the top of the front page.

Along with the ease with which the exercises may be scored is the ease with which the student's score in terms of a scale value may be calculated. As pointed out by Dr. Truman Lee Kelley, the most reliable scale score for an individual is that score where the amount of error and the amount of correctness are the same. Although the calculation of this point is somewhat involved, the score may be arrived at in a very few seconds with the use of tables recently worked out for this purpose. The data in the original tables have been adapted for use with these scales so that, having the number of errors tabulated in the form provided on the front page of the scale, the student's score may be readily determined merely by consulting two short keys and making one simple addition and one simple subtraction.

From having the scores thus expressed in terms of a scale unit, several advantages accrue. Comparisons of achievement in terms of definite amounts may be made, a process that cannot be done with accuracy with the use of ordinary standard tests made up of unscaled data. The scores made by students on one scale are of the same magnitude and value as those made on another similar scale, even though the starting and ending values of the exercises in the two scales differ. This is a feature that is possible in the usual scale only when the difficulties of the tasks in the duplicate tests are identical—a feature that is not only difficult to attain but also one seldom achieved. From the foregoing statements it is apparent that this series of scales possesses features that should characterize every educational test or scale of this type; namely, there are duplicate scales for each of the subjects so that accurate comparisons of achievement may be made; also additional duplicate scales can be developed with very much less work than the two original scales in each subject required.

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National Association of Directors of Educational Research

(E. J. ASHBAUGH, *Secretary and Editor*)

REPORT ON THE SEVENTH ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF DIRECTORS OF EDUCATIONAL RESEARCH

Six years ago at Cincinnati during the meeting of the Department of Superintendence a little group of men, engaged in the relatively new field of educational research in public schools, met for a round table discussion of the problems which were facing them. Believing that an organization of the men of common interests in this field would be both helpful to the men themselves and stimulating to the country at large, they formed a preliminary organization and named committees to draw up a constitution and launch the movement.

At Detroit the following year this initial group with a few others came together for a dinner and an evening of discussion. The next year (1917) at Kansas City a half-day session public program was offered and evoked enough interest to warrant the preparation of a yearbook, which was published by the National Society for the Study of Education as its Seventeenth Yearbook, Part 2. The reception of this yearbook on the part of the public justified the effort of the association in that direction, and the growing numbers attending the public programs have continued to testify to the quality of the material presented upon them.

At the Atlantic City meeting three years ago another public program was offered. Apparently no new developments came about at this meeting except that a new secretary was elected—George Melcher having served from the beginning and having asked to be relieved—and the first provision for regular annual dues was made. The fact is that at this meeting the members were so much occupied in congratulating themselves on the yearbook (which had just appeared) that new ideas were not forthcoming.

Two years ago the members of the association, feeling that they were unable at the public meetings to get all of the intimate critical give-and-take upon their problems which they had originally expected, provided for a one-day meeting open to members only. The first meeting of this sort was held at Cleveland last year.

The second annual closed meeting was held Saturday, February 26, 1921 in Hadson Hall Hotel. About thirty were present, and the meeting was thoroughly informal.

Dr. McCall reported on the development of scale construction with special reference to the new Thorndike-McCall Reading Scales. He called attention to the fact that the maker of an educational measurement scale might employ one of the following five methods: (1) percentile; (2) variability of adult judgment; (3) variability of adult performance; (4) age scale method; (5) variability of pupil performance. He presented the objections to each of these methods as they occurred to him in the making of his reading scales for elementary-school pupils.

The objections are herewith listed practically without discussion, being numbered in the same order as that in which the methods are named:

- (1) Objections—(a) varying zero point and (b) unequal units.

- (2) and (3) Inappropriate for an elementary reading scale.
- (4) (a) Inequality of units; (b) educational growth not equal for different years; result sometimes negative.
- (5) (a) Usually involves an attempt to locate zero point, but no agreement or means of reaching agreement in finding it or determining what zero ability is; (b) yields relatively ephemeral results; and (c) in order to produce an even step scale, a large proportion of material must be thrown away.

Therefore, there is need for a method that will have units comparable within the scale itself; units comparable with units of other scales; and a constant reference point. His solution of these problems is given in the latest issue of the *Teachers' College Record*.

Miss Race, psychological examiner for the Kansas City, Missouri, public schools, next presented some experimental data on intelligence scores and silent reading scores.

Saturday afternoon Dr. Rugg reported for the subcommittee on standardization of statistical terms, and suggested that this association should not act until the committee of the National Research Council which is working on the same problem shall have made its report.

Dr. Ashbaugh reported for the subcommittee on child accounting; and Professor Curtis reported for the general committee on standardization. Curtis showed that the returns from his questionnaire were distinguished rather for their differences than for their unanimity of opinion, though the membership tended to divide into two fairly definite groups. He recommended that a decision on policy be based upon the discussion by the members present rather than upon the majority vote he had obtained on the propositions submitted.

A committee, of which Curtis was chairman, was therefore appointed to report to the association on Thursday.

Two actions were taken, however, of which our members should take special note:

- 1. Motion carried that the reliability of a test shall be understood to be the degree of correspondence between successive scores of the same individuals on the same test.
- 2. Motion carried that in reference to correlation, members of the association use the term "Product Moment Method" instead of the term "Pearson Method."

On Thursday the open meeting of the association was held. An account of it is given below. Because large numbers of the superintendents as well as some of our members had to leave Atlantic City during the afternoon or early evening, it was decided to change our annual dinner to a noon luncheon. When President Haggerty asked for roll call, three honorary members (J. McKeen Cattell, E. L. Thorndike, and J. M. Rice) and thirty active members responded as follows:

Active Members

S. A. Courtis	Arthur S. Otis	Ira J. Bright
B. T. Baldwin	J. Freeman Guy	Elmer K. Serton
G. M. Whipple	R. L. Morton	H. A. Greene
Laura Zirbes	H. C. Daley	Thomas J. Kirby
Edna Gordon	J. Cayce Morrison	Charles Fordyce
P. C. Packer	W. W. Coxe	Emma M. Brown
M. E. Haggerty	M. R. Trabue	Harriet M. Barthelmess
E. J. Ashbaugh	George Melcher	B. R. Buckingham
A. B. Wight	Carter Alexander	Henrietta V. Race
L. A. Williams	W. J. Osburn	Harold O. Rugg

Due to the limited time at our disposal, necessary items of business were cared for at intervals during the progress of the luncheon. The president first announced the names of the three men who were elected to honorary membership this year. These were: Dr. Lotus D. Coffman, Dr. Clark Wissler, and Dr. J. McKeen Cattell. Dr. Cattell was the only one of these three men who were able to be with us at the luncheon.

The secretary also announced that during the past year there had been twenty-three members added to the active roll. The complete membership list will appear in the next issue of the Journal.

A communication from Dr. L. P. Ayres, a charter member of our association, containing his resignation from membership was read. The association voted to accept his resignation with regret, and elected him immediately to honorary membership.

The committee appointed on Saturday to revise the membership article of the constitution reported, and after a slight modification had been made, the report was accepted. The new article will appear in this department in the next issue.

The committee on standardization rendered a report which the association adopted and ordered printed in the Journal at an early date. Action was also taken requiring that the report on child accounting which was read on Saturday should be sent out to the members for vote, and the committee on standardization was given discretionary power to print this report also.

The president's annual address confined itself largely to the progress in intelligence testing. It was received with so much favor that the association requested that it be printed in the Journal for the benefit of our entire membership.

The following were elected for the ensuing year:

President—Dr. H. O. Rugg, Educational Psychologist, Lincoln School, Teachers College, Columbia University, New York City.

Vice-President—Dr. Virgil E. Dickson, Director of Bureau of Educational Research, Oakland and Berkeley, California.

Secretary-Treasurer—Dr. E. J. Ashbaugh, Director of Bureau of Educational Service, State University of Iowa, Iowa City, Iowa.

(The following write-up of the Thursday program was contributed by our accommodating editor, B. R. Buckingham.—E. J. A.)

After dragging through the intervening days and conscientiously exposing ourselves to the warmed-over program materials offered at other meetings, it was a relief to attend our Thursday meeting. Nor were we alone in our notion. Although President Haggerty had scheduled the meeting for the unusually early hour of nine o'clock, the hall was fairly well filled when the first paper was announced, and by ten o'clock we were playing to standing room only.

The program moved forward with clock-like precision. Every person who was scheduled for an address was present. Each paper was given precisely in the order of its appearance on the printed program.

Mr. Buckingham's "One Hundred Percent Promotion" showed how actual promotion rates of 95 percent were secured in two cities for three successive semesters without detriment to grade standards. Mr. Fordyce presented a capital paper on the classification of children through the use of intelligence tests. Mr. Whipple let us into some of the mysteries in the derivation of the National Intelligence Tests. His observations on

the value of these tests and the uses that may be made of them were well received. Mr. Bright showed some of the uses he has been making of intelligence examinations with high-school freshmen. His results were related to the success of pupils in several school subjects. Mr. Thorndike distributed copies of his Intelligence Examination and gave a highly suggestive talk on the testing of high-school graduates, using this examination as his text. This ended the morning program. President Haggerty had planned to close the session at 11:45 and the smooth-running machine which he had set up came to a halt exactly as scheduled.

By telescoping business with eating we were able to accomplish a great deal of both. The afternoon program was to begin at two o'clock in another building. The luncheon, however, lasted until nearly two-thirty. The president, not being endowed with the property of ubiquity, dispatched Mr. Fordyce to open the meeting and introduce Mr. Gray—W. S. of Chicago—to the expectant audience. Any expectations which the audience may have entertained were amply justified. For concrete, helpful data such as could be used in the classroom, Mr. Gray's paper on "Diagnostic and Remedial Steps in Reading" was only rivaled by Mr. Horn's on "A Constructive Program in the Development of Ability to Read Complicated Materials." Indeed, so rich were these papers in what Horn calls "factual" material that nothing short of the careful reading of their printed reports will be fully satisfactory. It is a tribute to these papers that the audience was frantically taking notes while the speakers were delivering them.

Mr. Rugg gave a paper on "The Curriculum in Economic and Social Studies." In this paper he maintained that teachers get little further than the textbook in securing materials for instruction, that textbooks were largely written by college men, and that the real sources from which the curriculum should be derived are the needs and uses of society. Mr. Alexander gave a highly interesting sketch of some of the factors influencing the successful presentation to the public of educational measurements. The "fact basis" of this discussion was in part the material which the State Department of Education of Wisconsin has gathered concerning publicity campaigns. He gave many important suggestions and cautions for publicity work.

Secretary Ashbaugh at this point tore himself away from the scribbling on which he had been mysteriously engaged and presented a paper on "The Measurement of Language." He reviewed the development of the measurement of composition and language from the very general scales of the Hillegas family through the more analytic instruments of Ballou, Trabue, and Green to those of Starch, Charters, and Kirby. He asserted that this analysis should go further and that instruments which get at specific details are the only ones which can be relied upon to reveal rather than conceal the defects of pupils in language.

The valedictory was pronounced by Mr. Courtis who presented "Research as a Distinct Function of Supervision." He showed clearly the truly remarkable type of organization which has been developed at Detroit. It is quite impossible within the limits of this sketch to say anything adequate concerning it. We can only hope that Mr. Courtis will give himself full scope in telling us about it when he submits his program article for publication.

We cannot conclude our account of the meetings of the association without an expression of appreciation to President Haggerty. The members of the Research Association and the public feel that an exceptionally scholarly and helpful program was presented as the result of his efforts.

JOURNAL *of* EDUCATIONAL RESEARCH

VOLUME III

MAY, 1921

NUMBER 5

EDUCATIONAL AIMS, IDEALS, AND ACTIVITIES

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Aims precede the curriculum. Alike in the organized writings of educators and in the changing conceptions of unorganized educational opinion, fundamental changes in the curriculum occur only after fundamental modifications of the aims of education have been discovered. Among the writers, Plato described the qualities of the perfect warrior guardian of the state before determining upon his education; Comenius presents the aims of virtue, piety, and learning before prescribing the curriculums of his systems of education; and Rousseau justifies his course of study by appeal to certain pre-formed assumptions concerning "the nature" of the child. Likewise, in the fluid movement of thought of the present generation when the curriculum of our times is in the making, we find that only after such aims as social efficiency have been subjected to prolonged discussion, do changes in the curriculum begin to occur.

This precedence of aims over subject matter is a necessity for purposes of selection and use. Because the information which youth inherits is beyond his powers of complete assimilation, selection must be made and a line must be drawn between the more useful and the less useful. And since selection is based upon value, educational aims must first be formulated. Moreover, since the functions of subject matter must be taught (for to present facts without an acquaintance with the uses to which they are to be put is futile) in the last analysis the use of any individual fact must be derived from the central aims of the whole system of education. So, for both selection and use the aims of education must precede the construction of the curriculum.

But though in all the educational classics, the writers have begun with the statement of aim, none has been able logically to derive an adequate curriculum from his aim. In every case there has been a mental leap from the aim to the subject matter, with no adequate principles to guide in the selection of material. This may seem to be a sweeping statement but a few illustrations will demonstrate its accuracy. In Plato's *Republic*, the author states his aim as follows: "Then in our judgment the man whose natural gifts promise to make him a perfect guardian of the state will be philosophical, high-spirited, swift-footed, and strong." Proceeding he says, "This then will be the original character of our guardians. But in what way shall we rear and educate them?" And answers his query as follows: "What then is the education to be? Perhaps we could hardly find a better than that which the experience of the past has already discovered, which consists, I believe, in gymnastics for the body, and music for the mind." He then proceeds to analyze gymnastics and music and argues for the inclusion of narratives, fables, and poetry in his course in music, which present certain proper ideals in the proper form, and of the proper types of melodies and songs. In his course in gymnastics he mentions little of the content but devotes his attention to the ideals of temperance, hardness, and health of body.

But this line of reasoning leaves much to be settled. Can the philosophical disposition be best trained through music? What parts of censored literature are to be selected? What gymnastic exercises are to be included in the curriculum? When the warrior has exercised in the gymnasium is he adequately trained for war or does he need some additional curriculum not mentioned by Plato?

This curriculum is not an adequate system of instruction for warriors. Within the last few years we have seen "a million men spring to arms," "high-spirited and strong," but they were not soldiers. Before they became the perfect guardians of the state their curriculum came to include much besides fables and poetry, melodies and songs. They had to learn to march, to shoot, to thrust with the bayonet, to fight in aeroplanes, and to sail the seas. Nor for the warriors of ancient Athens, who needed much specific training in the field and camp before they could perform

the acts of protection or aggression mentioned incidentally in the arguments of the *Republic*, was Plato's curriculum adequate.

The aims and curriculums of Comenius present the same insufficiency. This great educator assumes the aims of education to be to bring to maturity the seeds of learning, virtue, and piety implanted within us by nature. He then outlines his course for the vernacular school as follows (after Quick): "In this school the children should learn—first, to read and write the mother-tongue *well*, both with writing and printing letters; second, to compose grammatically; third, to cipher; fourth, to measure and weigh; fifth, to sing, at first popular airs, then from music; sixth, to say by heart sacred psalms and hymns; seventh, catechism, Bible history, and texts; eighth, moral rules with examples; ninth, economics and politics, as far as they could be understood; tenth, general history of the world; eleventh, figure of the earth and motion of the stars, etc., physics and geography, especially of native land; twelfth, general knowledge of arts and handicrafts."

Comenius sets up a threefold aim—learning, virtue, and piety. If we consider learning first, and ask whether it is possible to learn everything, the answer must be negative. Even though the *Orbis Pictus* was supposed to be a compendium of all knowledge, the compiler selected a few facts from the total mass. But when we ask for the basis of selection of facts no answer can be given. So far as the aim of learning is concerned with the selection it provides no criterion. Learning is learning and one fact is as good as another. If, however, we say that virtue and piety are the subsidiary aims which determine what facts should be learned we are still without a basis of selection. Will ciphering, or singing, or economics assist in any peculiarly valuable way to promote these two ends? Or, to carry the question further, what details of ciphering or economics will be most valuable in promoting virtue and piety? None, since one is as virtuous as another. Obviously, subject matter cannot be derived from learning of virtue and piety.

The impossibility of deriving subject matter from these aims is due to the fact that they are ideals isolated from activities. A virtuous carpenter does not perform the same actions, nor meet the same problems as a virtuous cook. A pious blacksmith receives a different education from that of a pious doctor. A virtuous and pious Chinaman thinks and acts on different matters

from those which engage the attention of a virtuous and pious American. The ideals are the same; the lives are widely different. It would be futile to teach a Chinaman the same curriculum as an American unless the intention were to Americanize him.

The curriculum is derived from both ideals and activities. Virtue, swift-footedness, piety, or social efficiency must be set up in a system of education; but in order to select the material to which these shall apply it is absolutely essential for the teacher to know the activities, problems, thoughts, or needs in connection with which these ideals are to operate.

Plato had a golden opportunity to set a new style in curriculum construction when he posited the perfect warrior as his ideal. If, instead of resting content with an enumeration of his qualities, he had analyzed the duties of the soldier, made what we call a job analysis, and had decided to teach swift-footedness, strength, high spirit, and the philosophic mind *through* these activities, he would have most profoundly influenced the education of two thousand years. But when he had stated his aim, he slipped back into the rut of the traditional subjects of his day as the best means of developing his aims. If, in like manner, Comenius had inquired into the activities of the French or English citizenry, had found out the important daily problems they had to meet and then had sought to make them virtuous and pious in their performance of these, he would have had a curriculum of demonstrable validity. He would then have known what ciphering, or economics, or political science, what music, sacred songs, and Biblical passages to learn. In other words, he would have been able to determine not only what subjects but what parts of subjects to include in his curriculum.

Ideals are both goals and standards. As goals, good taste, virtue, health, eloquence, and completeness of life are expressions of valuable ends for which men reach and whose attainment spells satisfaction. Discover the ideals of a nation and the trend of its action is known. As standards, ideals are arbiters of actions. One action may be discarded because it does not promote the ideals, while another may be accepted or modified because its performance leads toward the goals. But no man who sets ideals as goals is able to build his life in a vacuum and order his actions to suit his plans. He is born into a social group in situations over

which he has no original control. He is confronted by the actions of other men actuated by different ideals. Thrown into one situation he develops a set of actions different from those he would have had in another. With both his situation and his ideals in mind he is compelled to perform actions whose character is determined by both the ideals and the situation. Instead of possessing ideals and inventing a situation which will further them, it is more nearly accurate to say that he starts with situations and modifies them so as to realize his ideals as fully as circumstances will permit.

For this reason the curriculum by which he is trained to perform the important activities of the group in accordance with the highest ideals is necessarily based upon both activities and ideals. And obviously any aim of education expressed only in terms of ideals must fail to function.

Today the same procedure is necessary if the curriculum is to be modified intelligently. We suffer from the failure to distinguish between ideals and activities in the current aim of social efficiency. On some occasions we think of it as social efficiency, as an ideal in the sense that ideals of social service are advocated. But on other occasions we think of the activities carried on by those who are socially efficient, such activities as voting, beautification of the city, and the observance of community health regulations. And the result has been that only spasmodically and incompletely have we been able to modify the curriculum. What should be done by those who advocate social efficiency as the aim of education is to determine, first, the ideals of socially efficient individuals; second, the fundamental physical and mental activities carried on by people in the United States; and third, by a process of laborious analysis to discover exactly what important specific activities shall be taught and what ideals shall control in the performance of each. Until the objectives of education are broken up into these two elements it will be impossible to make an adequate reorganization.

AN EXPERIMENT IN PROMOTION¹

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In the fall of 1918 the influenza epidemic badly disorganized the schools. It became evident that unless the usual exactions with reference to promotion were mitigated an unusually large number of children would fail of advancement. Perhaps because of this fact, the superintendents at Springfield, Illinois, and Decatur, Illinois, were more hospitable than would ordinarily have been the case to a proposal whose purpose was to increase the promotion rate.

The plan was simplicity itself.² It contemplated that each teacher toward the close of the semester should make the usual lists of pupils recommended for promotion and for failure; but that the pupils recommended for failure should be advanced to the next higher grade along with the pupils whose title to the next higher grade was clear. The plan further contemplated that the pupils who were thus advanced despite the teachers' recommendations for failure should be carried in the higher grade on probation and should be subjected to a regimen carefully devised and frequently checked up with a view to stimulating the pupils, the parents, and the teachers to increased effort.

This arrangement did not, however, contemplate 100 percent promotion. The pupils who were advanced on probation were not regarded as officially promoted until, as a result of the efforts made during the trial period, they had given evidence satisfactory to the teacher and the supervising officials of ability to maintain themselves and to profit by the work of the higher grade. Only under these circumstances was the promotion actually consummated.

The probationary period began with the first day of the new semester and lasted six weeks. During this period the receiving teacher kept for each probationary pupil a card on which was

¹ A paper presented at the meeting of the National Association of Directors of Educational Research at Atlantic City, N. J., March 3, 1921.

² It has been worked out in detail with experimental data by Mr. H. T. McKinney, a graduate student in education at the University of Illinois.

shown in the first place the record of the pupil in the previous semester and grade—i.e., the record which caused the sending teacher to recommend him for failure. In the second place, the receiving teacher indicated for each of the major subjects and for each week of the probationary period whether the pupil's work was satisfactory or unsatisfactory. Thus, at the end of the first week, the teacher indicated whether or not the reading had been satisfactory; whether or not the arithmetic had been satisfactory; and the same information as to language, geography, history, and spelling, so far as these subjects applied. The teacher also entered her best judgment as to whether the work as a whole—i.e., in all the subjects considered together—was satisfactory or unsatisfactory. Similar entries were made for the second, third, and successive weeks. At the end of the six-week period the measure of success or failure was fairly detailed.

In the third place, the receiving teacher recorded the efforts which she made to assist the pupil in maintaining himself in the higher grade. No little preparatory work was done in an experimental way in setting up this part of the record. A number of plans and devices for assisting pupils which had been found to work out in similar cases were considered. As a result we distinguished eight devices, and on these we asked the teacher to report which ones she used in the first week of the probationary period; which in the second week; which in the third week, and so on. The eight devices set up on the cards were: (1) visits to pupil's home; (2) other interviews with parents; (3) help outside of school hours; (4) varying the course of study; (5) varying the teaching method; (6) using pupil cooperation; (7) daily reports to parents; (8) sending home pupil's work. The teachers were furnished with considerable detail as to the use and proper value of each of these devices. Most of the devices, therefore, had a broader meaning to the people who were to use them than the mere naming of them implies.

For example, the device which I have called, "Daily reports to parents" was administered in two subordinate operations. It involved the provision of a small notebook of uniform size for all pupils concerned. It contemplated the entry by the teacher at the close of each day of an estimate of the work of the pupil for that day. The book containing this estimate, together with any

recommendations which the teacher might find advisable, was signed by the teacher and carried home by the pupil in the afternoon. As evidence that the parent had seen the report, the pupil was required to return the book the next morning with his parent's signature. In order to prevent the forging of signatures, teachers were advised to obtain on the first day of the probationary period *bona fide* signatures of all parents of probationary pupils. At this point I am tempted to digress to give evidence in support of the efficacy of this device. Both as a school man and as a parent, I know positively that even progressive schools are not realizing the tremendous possibility of systematic cooperation in the home. Even the best homes are surprisingly ignorant of what goes on in the school and of what pupils are expected to do. The steady pressure and sustaining influence of the home which is kept constantly and authoritatively informed is little realized by school people.

Finally, at the conclusion of the six-week probationary period the teacher was required to enter on the probationary card of each pupil her recommendation as to the retention of the pupil in the grade to which he had been advanced on probation. Provision was also made for the recommendation of the building principal on each card and for final action of the superintendent.

During the course of the probationary period arrangements were made for supervising the efforts of the teacher. The pupil's individual card containing, as we have said, the detailed scholastic standing and the notations as to devices used to aid the pupil, was kept filed in the office of the principal and was made available to supervisors and to the superintendent. In other words, the teacher did not retain the card and offer it for inspection when called for, but she kept it permanently filed in the principal's office, except when she needed it for the purpose of making entries upon it.

Let us now return to conditions as they were toward the close of the first semester of 1918-1919. The influenza and the Christmas vacation had just passed, and each had done its worst for the schools. Teachers at Decatur and Springfield, ignorant of the impending experiment in total promotion, were making up their lists of pupils recommended for failure. It was a long list aggregating at these two cities 1,276 pupils, exclusive of those in

the low first grade and the high eighth grade. After these lists had been made out and submitted to the superintendent, it was announced that all these children would be advanced to the grade to which they would have been promoted if they had not been recommended for failure. Accordingly, all the classes, except those in the grades mentioned, moved forward *en bloc*, each with a little group of probationers.

Observe that we have here a new emphasis in connection with the administrative problem of promotion. According to the plan which we are accustomed to follow, attention is centered upon the sending teacher. The promotion rate for each class is a matter of concern, but it has reference to the class as constituted at the close of the previous semester. Little heed is given to the receiving teacher. Very few principals or superintendents make her activities with reference to promoted pupils matters of record. Realizing no responsibility in connection with promotion, she not infrequently devotes some attention to trimming up the class which she has received. Pupils, if they are "difficult" and if they are old enough, drop out of school. We do not assert that the receiving teacher takes the initiative in inducing them to do this; but the measures she adopts to retain an undesirable pupil who is minded to leave school are likely to be feeble and ineffective. Again, the process of trimming up the class is effected by securing an occasional transfer of a pupil to some other class of the same grade either in the same building or elsewhere. Not infrequently the receiving teacher reports certain pupils for demotion, asserting that they have not been sufficiently well prepared and leaving it to be inferred that their promotion was secured through the undue liberality of the sending teacher. In fact, the sending teacher is often freely criticized by the receiving teacher. Not infrequently this criticism is outspoken and unprofessional.

When, however, the sending teacher has nothing to say about promotion further than to recommend probationary pupils; when promotion rates are made up on the basis of the number of children who maintain themselves in the grade to which they have been advanced; when, in short, it is the receiving teacher upon whom the spot light is turned and whose reputation is involved, we have automatically provided not only for a new emphasis but also for a new result.

At this point we should like to raise the question of the propriety of deciding upon the promotion or failure of a pupil in this way. The usual criterion of promotion is ability to "pass" the work of the previous grade. In other words, promotion to a given grade is dependent upon success in the work of the grade next below it. We believe that a higher law supervenes at this point. We believe that the decision as to promotion should rest upon a consideration of what the child needs to learn rather than upon what he has learned. The school exists for the child; the question of his classification is, in the highest sense, to be decided with reference to the adjustment which the school is thus permitted to make to his needs.

We have set up in our American schools a system of artificial grades. Having set it up, we have worshiped not its substance but its form; not the duty but the temple built by our own hands. We have blinded ourselves to the fact that the grades which we have created are only administrative devices intended to facilitate the handling of large groups of children. We have asserted the sequential character of these grades and maintained to the extent of denying the visible fact that children are often entirely capable of negotiating the course of study of one grade without having spent a year negotiating the course of study of the previous grade. We have ignored unquestioned evidence of the fact that grade lines cannot be sharply drawn; that the overlapping of one grade upon another is so extensive that in individual cases membership in a given grade fails to establish to a useful degree of accuracy what a child knows or what he can do.

One grade is really distinguished from another by differences in the course of study. Sometime these differences are very great. The difference, for example, between the sixth and seventh grades with respect to the teaching material is especially pronounced. The New York course of study (to take a particular instance) introduces a new history subject, two new continents in geography, and a course in elementary algebra, to say nothing of manual training and domestic science. It is our judgment that the promotion of children should take account of the extent to which they have been offered the course of study of a given grade, since it is by the course of study rather than by the attainments of pupils that one grade is most unequivocally distinguished from

another. It is proper that our promotion scheme should contemplate the advancement of pupils from one grade to another on the basis not of attainment but of the course of study; on the basis, in other words, of the course of study to which they have been subjected and the course which lies adjacent to it. There is plenty of evidence to show that causing a child to repeat the work of a grade may cause no improvement in his work, although it is done with the abiding faith that improvement will take place. Under these circumstances, it is a hazardous undertaking—an undertaking which it is difficult to justify—to deny a pupil of, let us say, the sixth grade, the opportunity to profit by the richer curriculum of the seventh grade.

I have already stated that 1,276 pupils from the high second through the high seventh grades were advanced on probation at Springfield and Decatur at the close of the first semester of 1918-1919. All these pupils would have failed in the ordinary course of events. As a result of the work done during the probationary period, however, something over three-quarters of them maintained themselves in the grade to which they had been provisionally advanced. By this means the promotion rate for these two cities was raised to about 95 percent.

During the second semester of 1918-1919—the semester at the beginning of which the probationary period had occurred—the superintendents of Decatur and Springfield obtained from their teachers opinions concerning this promotion scheme. Superintendent Allen of Springfield secured an unsigned vote of the teachers in which they indicated whether in their judgment the experiment ought to be continued another semester. The vote was almost unanimous for continuing it. Accordingly, the identical procedure which had taken place in January was repeated in June. This time 881 pupils who would ordinarily have failed were provisionally promoted. This was only about two-thirds as many as had been so promoted the semester before. The drop was largely accounted for by two circumstances; first, there was no epidemic during the second semester, and second, the second semester of any school year is, as all practical school people know, a better semester than the first. In a system having semi-annual promotions fewer children fail in June than in January.

The probationary period for these 881 pupils did not, of course, occur until the following September and October, that is until the fall of 1919. Again three-quarters of the children made good, and as there were fewer probationary pupils than before, the promotion rate was even higher than 95 percent.

Again it was decided to continue the experiment; and in January, 1920, the list of pupils promoted on trial consisted of 984 names. This time the probationary period resulted in the permanent promotion of only 60 percent of the pupils who were provisionally advanced. This drop in the rate was caused by the fact that during February and March an epidemic of measles, followed by whooping cough, was so severe as actually to close up some of the schools for about two weeks. This disturbance occurred during the probationary period. Some receiving teachers rightly felt that in many cases they had no foundation on which to base a recommendation for permanent promotion.

One would no doubt like to know to what extent the same pupils came up for probation one semester after another. If by this special process we are able to stimulate pupils so that they become acceptable as members of a higher grade, it is more than likely that by the time the next lists are made up they will again be found among the doubtful pupils. If such is the case, our promotion scheme will be continually addressed to much the same group of incompetent pupils, and the securing of their promotion will be a labor of Sisypheus.

It will be recalled that at the first probationary period 1,276 pupils were on trial. Only 172 of them came up for the same treatment at the close of the second semester. Of the same 1,276 pupils only 59 were placed on probation on all three of the occasions when this probation plan was used. Curiously enough, by no means all of these 59—indeed only about half of them—were found to be mentally deficient. Of the 1,276 who were first placed on probation only 76 came up for similar attention a year later—i.e., the third semester of our investigation. Or, to look at it in another way, of the original 1,276 probationers 1,087 did not become probationers on either of the two subsequent occasions. This represented more than 85 percent of the first probationary group. Similar statements could be made concerning the second group.

In many instances the receiving teacher and the sending teacher were the same person. In other words, the teacher went forward with the class. It has sometimes been urged that this kind of an arrangement will secure a higher promotion rate. Our data did not show this to be the case. There were in all 3,141 cases of advancement on trial. In exactly 1,100 of these cases, the teacher moved on with the class, while in 2,041, or practically twice as many cases, the teacher changed. In cases where the same teacher was involved 70.3 percent secured promotion. In cases involving a change of teacher 71.9 percent secured promotion. The result when the teacher moved forward with the class was, therefore, not quite as good as was the result when the teacher changed, although the difference was practically negligible.

One would also like to know the effect of this promotion scheme on scholarship. A drive of this sort might be expected, like most concerted efforts, to produce large results in the intended direction. The results, however, may be accompanied by compensating disadvantages. Comparing the scholarship of pupils during the probationary period with their scholarship at the beginning of the probation, we found that 74 percent of the pupils who consummated their promotion to the higher grade gained in scholarship; that 24 percent of them neither gained nor lost; and that only the remaining 2 percent lost ground. It would be natural to suppose, on the other hand, pupils who failed to secure promotion despite the efforts during the probationary period would show a loss in scholarship. A stationary condition, however, was the prevailing one for these pupils. The records stood at 9 percent gained, 7 percent lost, and 84 percent unchanged. Of the entire 3,141 probationary cases, 56 percent showed improvement in scholarship; 41 percent showed no change, and 3 percent showed a loss. It is a curious fact that most of the loss in scholarship occurred on the occasion of the first use of the total promotion plan, namely in February, 1919. The results expressed in terms of improvement in scholarship were appreciably better on the second and third trials of the experiment.

It may seem that a comparison of the scholarship as evinced during the probationary period with the scholarship shown at the beginning of it is unconvincing. More convincing would be

a statement of the broad general effect of the 95 percent promotion rate on the scholarship of all the pupils in all the grades. One might indeed expect and condone a small falling-off in the ratings of pupils. Grade standards are not the highest objectives in any school. They may be purchased far too dearly. The comparison of median grade scores with the norms of standard tests may lead to unfair conclusions. Not a few schools maintain high grade standards not because the pupils are either capable or well taught but because all but the most capable are held back and eliminated.

Be this as it may, the comparison of the scholarship records at Springfield and Decatur before the experiment and afterwards will be suggestive.. Combining the percentage ratings of all the pupils in the elementary schools of these two cities, we find that the average for the semester ending in January, 1919, was 80.4. This was the result prior to the installation of the new plan of promotion. The corresponding figure for the semester ending June, 1919, was 81.4. This was after 75 percent of all the children who under ordinary circumstances would have been held back had been advanced to a higher grade. The figure denoting the average scholarship of all the pupils in both cities and for all subjects had not fallen. In fact, so far as there was a change, it had been in the direction of improvement—namely from 80.4 to 81.1.

A fuller effect of the new promotion plan, however, might be expected to be registered after two semesters—that is, after the schools had twice put the plan into effect. The average scholarship rating at the end of the second semester of the experiment was 82.2. Again the scholarship, as far as it was measured by the official school ratings, had not fallen. As a matter of fact, it had again risen slightly. To recapitulate: the three figures indicating the scholarship before the experiment, the scholarship after one semester of it and the scholarship after two semesters of it were 80.4, 81.1, and 82.2.

Our investigation covered a number of additional topics on which it would take too long to enlarge. Perhaps I ought, however, to allude to the analysis which we made of the causes of failure, or rather in this case, the causes of the recommendation for trial promotion. Since this recommendation for trial promo-

tion was primarily the same as the usual recommendations for failure, the causes, so far as they operated in this case, would have general significance. We recognized seven causes of failure, and I list them in the order of their frequency of mention by the teachers as operating causes, first being the most frequently mentioned: (1) wrong attitude toward the school; (2) mental defect; (3) irregular attendance; (4) poor home conditions; (5) physical defect; (6) changing from one school to another; (7) poor social conditions. When we try this experiment again, we shall more definitely relate the device to be used in the probationary period to these alleged causes of failure.

We realize that these causes are not mutually exclusive. There are those who assert that the fundamental cause is mental defect, and that wrong attitude, poor home conditions, changing from one school to another, irregular attendance, and poor social condition are attributable to a low level of intelligence either on the part of the pupil or on the part of the family. So far as the mental deficiency of the pupil is concerned, we have some, though by no means complete, evidence that the failure of pupils was neither exclusively nor to a very large extent due to it. I have already referred to the 59 pupils who were put on probation three times. It would seem that mental defect would be especially prevalent in this group. The results of our investigations, however, did not support this presumption. Not more than one-half of them could be pronounced defective.

Our experiment proved interesting even beyond our expectations. The value of such a method of promoting pupils cannot perhaps be determined from an application of it in two cities whose total elementary school enrollment does not exceed thirteen or fourteen thousand; but when the method is tried not once, but three times and when the results are so uniformly favorable, we feel that we are sufficiently modest if we maintain that it offers interesting and important possibilities in administration.

A CONSTRUCTIVE PROGRAM IN SILENT READING¹

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The first step in a constructive program in silent reading is to mark out the objectives to be attacked. The material which we read silently falls into two large classes: that of a literary nature, read primarily for leisure purposes, and that of an informational character, read for the most part with a work attitude. While the abilities involved in the appreciation of literature are very significant, it seems wiser to classify them under the term *literature* and to develop them by special technics. At any rate, in this discussion the term *silent reading* will be used as a group name for those abilities which insure efficient work with books. The aims involved in this type of reading are more easily determined and more easily understood than in the case of literature, where the objectives are troublesome to mark out, the method of treatment hard to discover, and the results difficult to test. Certainly the standards for judging the two abilities are not the same. For example, it is by no means clear that it is always desirable to read literature rapidly. The individual who reads two stories in an hour does not benefit twice as much as he who reads but one in the same time. As a matter of fact, as in the case of poetry, it is often not even desirable to read literature silently at all.

Most of the tests and discussions of silent reading have emphasized two abilities, speed and comprehension. To these must be added two others, namely, the ability to organize and the ability to remember. Organization may be regarded as a logical part of comprehension, but in any program for the improvement of this ability it is necessary to focus upon it as a special objective. The ability to remember what has been read involves special technics which are not likely to be developed unless specifically set out and practiced. It is possible that a fifth group of abilities should be added to these four, including such technics as judging the worth of books; and the proper use of indexes, tables of contents, of

¹ A paper presented at the meeting of the National Association of Directors of Educational Research at Atlantic City, N. J., March 3, 1921.

dictionaries, encyclopedias, other reference works, the card index, and other library aids.

Of these abilities perhaps comprehension should be most strongly emphasized. In fact comprehension is necessary as a basis for progress in any of the other abilities. Rapid reading without comprehension is of no value. It is impossible to organize properly unless one understands the detail of the material which is to be organized. Accuracy of comprehension is necessary if material which is memorized is to be of any use.

CONSTRUCTIVE PROGRAM IN COMPREHENSION

The simplest element to which the problem of comprehension can be reduced is, of course, the word. In the last thirty years there have been a great number of very helpful studies of the vocabularies of children. All this information should be gathered up. There is need, also, of further investigations which will give us a more adequate idea of the type and extent of children's vocabularies in the various grades. There is particular need for some definite knowledge of the accuracy of comprehension of the three or four thousand words which may be regarded as basic in any reading vocabulary. It seems quite possible that one of the chief contributions of the kindergarten and early primary grades will be to give the children an enriched and highly accurate vocabulary.

Our reading and language tests have added to our information as to the ability of pupils to read sentences of varying length and complexity. We need, however, much more careful studies to point out degrees of difficulty in various types of sentences and to discover the elements of sentence structure which cause most difficulty. As a part of this work it is important to have a study of technics by which pupils may be encouraged to read in terms of thought units.

The low ability of students to understand paragraphs has been shown by such studies as that of Thorndike. During the last three years there have been a number of experiments at the University of Iowa to determine the ability of students to read paragraphs taken from textbooks in such subjects as history, geography, mathematics, hygiene, and science. The following is typical of the selections and exercises used.

I want to see how carefully you can read a short paragraph. After you have read it you will be asked to answer some questions about it. In answering these questions there are three things you should remember. They are:

1. Give just the information needed to answer each question but make sure that the answer you give is to be found in the paragraph.
2. If any question is asked for which you think there is no answer given in the paragraph, write on your paper, "The paragraph does not tell."
3. You may read the paragraph as often as you wish to make sure your answers are correct.

Now that you know exactly what to do, read the following paragraph and answer the following questions just as you have been told, remembering that you may have all the time that you need.

PIONEER FURNITURE

The big fireplace would be among the first things to attract attention. Above it, resting on a shelf, or mantel, would be seen a candle, a clock and one of the housewife's most beautiful plates. Within the fireplace fastened at one side would be seen the crane upon which hang the kettles over the blazing fire.

Sketch the picture you see when reading this paragraph.

A large proportion not only of the elementary-school children but also of high-school and college students and even of superintendents drew for a pioneer clock a modern alarm clock.

After using this illustration in a lecture on the subject of silent reading a teacher in the audience decided to test the comprehension of some of her pupils. The class was reading in preparation for Washington's birthday. One pupil had just read the sentence "Washington was very fond of outdoor sports." Upon being asked the meaning of this sentence he said, "Those were the fellows he ran around with."

It is entirely possible that much of the difficulty college students have in their work grows out of their inability to read accurately. In a series of experiments now being conducted at the University of Iowa, it is shown quite clearly that there is a considerable number of students who cannot read anywhere nearly as well as some students in the elementary school. In fact students are found in the freshman class who score in comprehension only one-fifth as high as some of the elementary-school children. A great many university students were found whose reading ability was of such a nature as to constitute a very serious handicap.

The main principles underlying a constructive program in improvement of this ability are:

1. The course of study must be enriched. This is not only the best method by which a vocabulary may be made more accurate and more extended, but it is also the best means of insuring that a large amount of factual material will be read.

2. It must be recognized that comprehension can best be taught and measured where material is logical and factual in character. For the purposes of developing comprehension, literary materials are likely to be inferior to selections which deal with such subjects as history, science, and geography.

3. Some of the best teaching of comprehension can be done in connection with the proper assignment of lessons. If assignments are focalized, if they involve large amounts of reference reading, and if the study period is properly supervised the study involved constitutes a very efficient and practical method of improving the ability of pupils in the comprehension of what they read.

4. As a part of all exercises in comprehension great care must be taken to provide rigorous tests. Not only should the student have an opportunity to show how accurately he has comprehended what he has read, but he should develop definite prejudices against reading which results in "half baked" or inaccurate ideas.

CONSTRUCTIVE PROGRAM IN SPEED

We shall probably find that too much attention has been given in the last three or four years to the development of speed in silent reading. No doubt this is due to the fact that speed in reading is easier to measure than are any of the other qualities. Small improvements and differences are comparatively easily shown. Moreover, considerable improvement may be made rather easily, since the prevailing rate of reading is in general rather low.

In brief, studies of the status of speed in reading seem to show that the improvement in this ability in grades IV-VIII and beyond is not what it should be. For a time the flattening out of this improvement curve led many students of the problem to assume that the ability was approaching its limit, and that additional practice exercises would give a small amount of return. However, the ease with which the standard rates for the various grades

have recently been surpassed by experimental groups seems to indicate that the rate for the intermediate and grammar grades is probably the result of poor methods of teaching.

It should be clear that one ought not to speak of *speed* in silent reading but rather of *speeds* in silent reading. The rate at which one should read is determined both by the material read and by the purpose in mind. It is quite possible for sixth-grade children to skim at rates running from six to nine hundred words a minute and to do so with perfect efficiency where the purpose is to discover the answer to a simple question. On the other hand, where material is rather difficult and is to be learned with some completeness, a reading rate of one hundred words a minute for the same children might be high.

How speed may be improved.—In all grades, and especially in the earlier years, provision must be made for *eliminating mechanical distractions* and for giving control of the mechanical phases of reading. All special exercises, such as phrase flashing, speed exercises in reading short directions, etc. should have for their purpose the shortening and strengthening of the bonds between the printed symbol and the idea for which the symbol stands. It should be remembered that it is quite probable that all tendencies to articulation are harmful except in the case of verbatim memorizing.

This raises the whole question of the teaching of phonics. It seems probable that any tendency to stop to analyze a word phonetically constitutes a distraction, although at some times a necessary one. A reference to phonics should be made by the child under much the same circumstances as those under which we refer to the dictionary. In other words, he should not be conscious of the phonic make-up of a word except when he must use this knowledge to determine what the word is. Perhaps an investigation is needed to show whether or not there is some subtle phonetic sense which aids in the rapid identification of symbols even when the reader is not conscious of the use of phonics.

It is the writer's judgment that a small amount of phonics should be taught in grades I, II, and III; and that, beginning in grade IV, a transition should be made to the pronunciation keys in the dictionary.

Basic principles.—The most essential condition for exercise in the improvement of speed is perhaps to be described under the

term "time pressure." If, however, the exercises are to be given so that proper reading habits will be developed, the child must read within the limits of perfect comprehension, and should realize that the results of his reading will be rigorously tested. These conditions hold whether or not the exercise consists of short word and phrase flashing or of the reading of longer selections.

In the case of longer selections, such as are found in the ordinary text, other conditions should exist. First, the material should be factual in character. Second, the child should have a purpose to guide him in his reading. Third, he should read at top speed but within the limits of perfect comprehension and without fluster. Fourth, he should be tested rigorously over the material read.

Where this is done there will be not only an increase in speed but also a large increase in comprehension. Dr. O'Brien's experiment, reported in the *Twentieth Yearbook of the National Society for the Study of Education, Part II*, showed that, according to one method of computation, the groups having special silent-reading drill made 31 percent more improvement than the groups having the ordinary work in reading.² Of course, such improvement is eminently worth trying for. But from preliminary experiments, organized on a somewhat different basis, it seems clear that as great an increase may be obtained in comprehension as in speed. For example, in one exercise children are given a problem, the answer to which they are to get by reading. They are asked to read at top speed but within the limits of perfect comprehension. They read with the knowledge that they are to be tested. At the close of the exercise a rigorous test is given in order to determine whether or not the answer which they secured was the complete and accurate answer to the question for which they read. There is reason to believe that the effect of reading under the guidance of a problem is not only to speed the child up but also to make conditions favorable for more adequate comprehension. At any rate, comprehension scores and speed scores do improve very rapidly where such drill exercises are given.

In addition to such special exercises as have just been described, there should be a large amount of reading of rather easy materials.

² O'Brien, John A. "The development of speed in silent reading," *Twentieth Yearbook of the National Society for the Study of Education, Part II*, p. 61, 1920.

This may be done in a free reading period and in directed home reading. For this purpose literary material may be used along with books of an informational sort. Without entering into a discussion of the reasons for this type of reading, it is significant that most students of the problem of improving speed in silent reading encourage extensive reading of easy material.

I do not believe we are yet in a position to say what sort of speed scores may be expected in the case of children in the various grades. As pointed out earlier in this paper, the scores will vary with the type of material and with the purpose for which it is read. In the case of such careful reading as students should do in preparing their geography and history lessons, the rate is probably less than children make on the Courtis test. According to Dr. Germane's³ findings, the rates in words per minute at which the children of a certain city read an article on tuberculosis were: sixth grade, 168.1; seventh grade, 168.9; eighth grade, 185.0. In the same city, the rates for reading an article on peanuts were: sixth grade, 165.9; seventh grade, 171.5; eighth grade, 197.5. Judging from the comprehension scores, even this rate was too hurried.

However, children who had had special drill were found to read these exercises with much greater speed, and with much better comprehension.

THE CONSTRUCTIVE PROGRAM IN ORGANIZATION

In a way organization may be regarded as subordinate to comprehension, but no amount of practice in the comprehension of the detailed data of an article will give satisfactory power in organization. This ability is very important. A very great proportion of the reading which we do involves the necessity of getting at the main points and of organizing these, usually according to some purpose. Dr. Germane found that a summary of material read often gave smaller returns than the same amount of time spent in thoughtful re-reading. A study of the detail of his experiment revealed that this was due to the fact that an ordinary pupil could not organize the material in the selection adequately and, therefore, could not summarize. This points rather clearly to the need of frequent and rigorous exercises in

³ Germane, Charles E. *The value of summarizing in silent reading as compared with the re-reading of the same article.* Doctor's thesis, State University of Iowa.

getting the main points out of a paragraph or chapter. Detailed exercises cannot be given here. It seems probable, however, that the best conditions under which such exercises may be developed are to be found in the regular work of the school. If assignments are focalized and detailed, if the student is encouraged to work carefully but at top speed during his study period, and if the recitation is based on the questions put in the assignment, considerable ability to organize will be developed. However, short exercises are necessary in order to put before students standards of the sort of work they are expected to do, and in order to develop proper methods of work.

CONSTRUCTIVE PROGRAM IN REMEMBERING

The constructive program in the development of the ability to remember what is read is based upon two things: first, that a single reading ordinarily gives a very small return, and that even this small return is very rapidly forgotten unless additional work is done to fix the material; and second, that there are certain technics which are superior for learning material thoroughly and for future use.

An investigation by Yoakum⁴ showed that the amount of material that could be reproduced immediately as the result of a single reading varied with types of material, but that ordinarily the proportion retained ranged from 20 to 40 percent. He found also that unless the material were read a second time, or unless some exercise was given to fix this material, very little would be retained after a few days.

As to the technic of remembering materials, Germane's investigation seems to show that until students have learned to summarize efficiently, better results are to be obtained by continued thoughtful re-reading, and by summarizing with the aid of questions prepared by the teacher. As in the case of other exercises, the best work in establishing the habit of learning material for future use can probably be done in connection with such subjects as geography, hygiene, nature study, and history. The proper conditions seem to be to read under the guidance of a problem or series of problems; to read directly through the article at fair speed but within the limits of perfect comprehension;

⁴ Reported in part in the *Twentieth Yearbook of the National Society for the Study of Education, Part II*, page 70 ff.

to have a set of questions, preferably the set presented in the assignment, which may be used for self-testing and as a basis for summarizing the material.

DANGERS

As a sort of summary to what has been said, it may be well to point out certain dangers which must be guarded against particularly.

First, speed exercises are likely to develop a *habit of "half-baked" and careless* reading, unless there be a strong emphasis upon comprehension and upon rigorous tests of results attained. Teachers must be urged to keep in mind always that only within the limits of accurate comprehension are speed exercises safe.

Second, there is a danger that an *interest in devices* and in more or less spectacular methods will weaken the teacher's attack on some of the more prosaic but necessary exercises. Certain devices, such as those which involve following directions and rapid flash card work are novel. Moreover, they make good show lessons. *A teacher must keep in mind that her best work will be done with exercises which approximate the sort of reading pupils are most frequently called upon to do in preparing lessons.*

Third, there is danger that teachers will use methods which, while attractive, are very uneconomical as methods of learning to read. This is particularly true of such exercises as those in which the pupil constructs something in answer to a reading lesson. The chief value in the construction is its measure as a test of complete comprehension. This is, of course, a real contribution for any exercise to make. Where such a test necessitates construction work extending over a period of 20 or 30 minutes it is clear that, for the purpose of developing ability in reading, the test is very expensive in time.

Fourth, there is a danger that an *undesirable consciousness of the process of reading* will be developed. In such a case the child goes through the motions of reading very rapidly, but the consciousness of the process operates as a distraction. It is best to avoid asking the pupil to read carefully, or to read accurately, or to read fast, but rather to give such directions as, "Will you find as quickly as you can the answer to this question, 'What are the uses to which peanuts are put?'" Such a question puts the child's attention where it belongs, namely, upon the thought, and will tend to insure the avoidance of any undesirable reading consciousness.

PRESENTING EDUCATIONAL MEASUREMENTS SO AS TO INFLUENCE THE PUBLIC FAVORABLY¹

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I. THE SITUATION

The growth of educational measurements during the past decade, curiously enough, cannot be adequately described in simple numerical terms. We have statistics enough about the number of tests sold, the numbers of books and articles treating of measurements, and the lists of courses in measurement work offered in schools of education and summer sessions. But this growth has been so phenomenal that mere figures are too weak to express it. To do it justice, we need to employ forceful images such as likening it to the gigantic business expansions of the war period.

But the great business concerns have been forced to curtail expansion and to devote their major energies to securing public demand for relatively small outputs. In like manner numerous signs indicate to a thoughtful observer that educational measurements must soon face a similar situation. Effective work in school measurements requires amounts of money which uninformed taxpayers will surely withhold. As a new movement in school work and as an agency certain to secure and to publish the exact facts, it will be early attacked by unscrupulous politicians accustomed to raise the economy cry with reference to public expenditures. To secure adequate financial support, it will be as necessary in the near future for a measurement bureau to convince the taxpayers that it gives unusual value for their money, as it now is for an automobile manufacturer or a clothing merchant to prove that he is offering a superior product at a bargain.

For the sake of better schools it is highly desirable that the educational measurement movement go steadily forward unhampered by lack of necessary financial support. To this end the speaker offers suggestions derived from an extensive study of the claims made for measurement work, as well as of publicity efforts in various school lines and in business salesmanship. Most analyses of successful procedure in publicity and salesmanship

¹ Address delivered in part before the meeting of National Association of Directors of Educational Research, Atlantic City, N. J., March 3, 1921.

stress the use of talking points and the handling of objections. Accordingly, it seems profitable to use this classification here.

II. TALKING POINTS ON MEASUREMENT FOR STRONG APPEALS TO THE PUBLIC

1. *Factual basis.*—The average taxpayer, in a time like the present financial stringency, is disposed to fight all appropriation increases. His representatives know this and make a display of voting against heavier taxes. To overcome such opposition, a cause must rely upon one or more of three supports. It must show a powerful emotional appeal, it must demonstrate that it is backed by an array of votes not safely to be ignored by a politician, or it must present its needs with such sound and exhaustive exhibits of facts that no reasonable voter can refuse its requests. School measurement work at present cannot hope to arouse much emotional support, although there should in time be a chance to exploit the very excellent work now being done in giving neglected children individual attention through disclosures made as a result of measurement work. Some of the items on work for neglected individuals reported at this convention have all the emotional possibilities that even a welfare worker of the "sob" school could desire. At present measurement work has little chance to secure support through popular votes. But it deals with facts as does no other phase of school work. It has an enviable opportunity to show a hard-headed business man or taxpayer that its requests for money are founded upon a minimum of theory and a maximum of facts. It can evolve a presentation based upon facts that cannot be really opposed and that can be answered only by evasion. It is thoroughly equipped to show up such evasion for precisely what this procedure is worth.

2. *Definiteness and finality.*—The average citizen interested in education does not care for vague general criticisms of school work. He distrusts elaborately qualified evaluations. He has no patience with the type of scientific "hedging" so often heard at our measurement discussions, "these conclusions are only tentative," or "this is probably the safer hypothesis unless so-and-so should prove to be true, which cannot be fully established until further investigations are made." Such cautious statements, while indispensable at scientific meetings, only incite his ridicule. He desires a direct authoritative statement of what is really known. If a thing is uncertain, it had in his opinion better not

be mentioned. He desires this statement to be clean-cut and often prefers it expressed in approximate numerical terms. Measurement work can point out the particular grade in a school system that needs special attention. It can state that the work in this grade is weakest in a certain subject. It can specify, for instance, that the arithmetic shows better results in speed than in accuracy. It can analyze the fundamental processes involved and show just which ones need strengthening. It can show how any such record compares with a standard or with work in comparable schools. All such things can be done with greater definiteness and finality by measurement work than by any other form of supervision.

3. *Brevity*.—In regard to school needs, the average citizen is like the Yale students who were never converted by any sermon after the first twenty minutes of it. He is not apt to be converted to increased school taxes after the first twenty minutes of any given effort. Measurement work, by virtue of its power to express its summaries and comparisons in statistical terms, has a distinct advantage in the public presentation of its needs over many other phases of school work. A measurement bureau, for instance, ought to be able to prove the case on any reasonable school need for more money in a fraction of the number of pages or lines of type necessary for many other school workers who might try to prove the same case.

4. *Impersonality*.—Theoretically, measurement work makes its studies with less personal bias or pre-judgments than any other kind of educational investigation. In actual practice measurement work sometimes appears to attempt to measure phases of school activity that are not easily or profitably subjected to numerical treatment, and to stress formal matters unduly. But if measurement workers are reasonably careful and use plenty of common sense, they can justly claim a very strong talking point for their pronouncements. They can be less successfully accused of sweeping statements, of hasty conclusions, and of hobby-riding than can any other persons attempting to evaluate school work. Their standards and procedures are often so simple that they can easily set a pupil to measuring for himself his own progress in school work.

5. *Prestige of up-to-dateness*.—A final talking point grows out of the fact that measurement work is now generally regarded in leading educational circles as one of the earmarks of an up-to-

date school system. If there is no unjust depreciation of the work of those who were making careful quantitative studies before the term "measurement" came into general use, this prestige value can be played up to great advantage. Teachers and communities may be frankly somewhat skeptical on many phases of measurements. But if the suggestion has been skillfully made that those opposing measurement work are thereby in danger of being considered unprogressive, many people will hesitate to oppose it. Much of the present vogue of measurement work undoubtedly is due to skillful exploitation of this particular prestige value. This talking point of course is more useful now than it will be after some years.

III. OBJECTIONS

In good business organizations, salesmen are coached not only on talking points but on all possible objections. They are not to bring up objections, but they are to be ready to utilize any that may arise. The former sales manager of the Ford Motor Company in his books on salesmanship takes great pains to elaborate the view that an objection if real is a sign of interest on the part of the customer.³ Briefly, the analysis runs thus: A possible customer does not take the trouble to object to a thing which has not attracted his serious attention. The objection is a sign of energy or attention to the proposition. It is the salesman's business by a skillful presentation of his case to divert this energy rather toward than against the proposition.

What, then, in the mind of the public, are the chief objections to measurement work for which the director of measurements should be prepared?

1. *Measurement work is too costly for the results secured.*—From the available literature and from fairly numerous reports, it is certain that in the present flush of enthusiasm some measurement workers have forgotten that the public will judge their activities by the same economy standards which they employ in evaluating school work. Any well-developed measurement bureau attempts to determine whether money for schools is economically spent and suitably apportioned according to the importance of the various phases of school work. The taxpayer is easily interested in the results of such analysis. He is certain to object to putting more money into measurements until he sees how this measurement work appears under the same kind of

³ Hawkins, Norval A., *The selling process*, chap. x.

analysis. The measurement bureau should accordingly be prepared to show that its own expenditures are justified. It spends some money and it consumes time and energy of both teachers and pupils. This time and energy represent the same cash value when expended upon measurements as when devoted to arithmetic or the keeping of school records. The measurement bureau must be ready to show better results for such cash equivalent than would have been secured by the regular school work that would otherwise have gone on. If approximately the same results can be secured with a twenty-minute test as with a forty-minute one, or with a battery of tests instead of with many different tests, or if a five-cent test will do instead of a ten-cent one, or if the clerical labor involved in one is only a fraction of that needed for a similar test, or if a rough oral test will suffice for an elaborate written one, the bureau should do the economical thing and advertise the fact.

Sometimes measurements produce only results that any careful, experienced observer in the system could have secured with a fraction of the money, time, and energy necessary to secure them through measurements. In such a situation the expenditures for the measurement work can best be defended by playing up impersonality values and uses for convincing incompetent but obstinate teachers of their incompetence.

It is, however, easy to make out a very strong case for the economies possible under the right kind of school measurement work. An examination of only the first ten numbers of the *JOURNAL OF EDUCATIONAL RESEARCH* and a few other periodicals indicates such economies as the following. To save space, only the volume and page references are given. Unless otherwise specified, the reference is to the *JOURNAL OF EDUCATIONAL RESEARCH*.

a. A much more accurate knowledge of individual abilities of pupils which may be utilized to let brilliant pupils out of work they do not need (2: 12, 13); to enable the teacher to know in 90 percent of cases just what each pupil needs (2: 620); to detect cases of shamming and laziness in pupils (2: 12); to reduce failures in high schools through superior guidance by teachers (1:380); to make more serviceable reports to parents as to their children's needs (*American School Board Journal*, February, 1921, p. 62; *Educational Review*, 59, p. 346).

b. The choosing of much better texts and the paying of prices necessary to secure suitable texts (1:119, 222-24; 2:671).

c. Better time allotments for subjects (2:736-40).

d. The saving possible by increasing the rate of speed in silent reading (1:136).

e. The actual cost of short terms and poor teaching in rural schools (1:271; 2:636ff).

2. *Some measurement workers do not seem to use enough common sense.*—Friends of the measurement movement, to say nothing of uninformed or hostile persons, feel that measurement workers sometimes exhibit a great deal of clerical and mechanical activity with insufficient thought and common sense. This is the idea back of Monroe's observation that teachers often consider tests as teaching devices and express dissatisfaction that pupils do no better after them.³ It was also in the mind of the intelligent man who told Ashbaugh that bureaus of reasearch so far had been simply "accounting" bureaus.⁴

Now, in ordinary life we object that taking snap judgment is unfair. But all of us know that in some schools children are being assigned to grades or promoted largely on the basis of one brief intelligence test—"in twenty minutes branded for life" as one keen observer recently put it. A capable school man without any direct knowledge of measurements told the speaker recently of the case of his two boys in a school system with which the man had no connection. Last year in this system half-yearly promotions were started. The pupils for the higher sections were selected by taking the results of one intelligence test, given carefully under expert supervision before Christmas. On the basis of this test one of the man's sons was promoted and one held back. Later in the year another similar test was given with equal care. The advanced boy was then pronounced average and the boy who had been held back was then said to be very intelligent. The father has made every allowance of which he can think, but naturally he wonders what it was all about. A trained measurement worker knows that occasional errors of this sort are inevitable; but it is very difficult to bring the ordinary man to this point of view, much less to induce him to vote more money for such work.

Common sense is indicated by frankly recognizing that there are still many phases of school work where measurements cannot

³ *Journal of Educational Research*, 1:97.

⁴ *Ibid.*, 1:421.

be profitably used. In some cases they probably never can be. Then, too, judgment needs to be exercised in the applications of results. Per capita costs, for instance, are very valuable in their place, but of little value for final pronouncements on upper classes, new departments, or elective courses, especially in small schools.

In Wisconsin we often wonder where the common sense was when the recent Ayres report on state school systems was compiled. The speaker has the greatest respect for the high purpose behind this great pioneer effort in educational research, as well as for the conspicuous ability that planned and executed the report; but the failure to use common sense in some places has materially lessened the value of the report to us in Wisconsin. From an educational campaign standpoint, nothing could be simpler than employing the social psychology involved in the fact that Wisconsin ranks thirty-third on this list and state pride wishes her to be near the top on any commendable list. But this campaign procedure is impossible because careful readers of the report, whether they are school men or not, are soon struck with the fact that certain important elements have been altogether omitted. The report, it will be recalled, attempts to measure just two things, attendance secured at public elementary and high schools, and expenditures upon these schools.

On the attendance basis Montana, the first state on the general list, is credited with a huge school enrollment which has been said by the United States Bureau of Education to be largely due to unusual immigration since the 1910 census. The Canal Zone, which gets only one-fourth of its children into school, has a higher index by several places than does Wisconsin where half the children are in public schools, to say nothing of many more in parochial schools. In the general list Wisconsin, with an illiteracy rate of 32 per thousand for those ten years of age and over, is thirty places below Arizona which has a rate of 209 per thousand for the same ages. From a common sense standpoint literacy in these ages would show about as clearly as anything the real results of public school work.

Although half the emphasis in the report is upon expenditures for public elementary and high schools, any account of money spent upon training teachers for these schools is omitted. Thus Wisconsin draws thirty-third place in the general list, notwithstanding the fact that, as nearly as we can figure, she spent in the year considered more money upon the training of teachers than

the first three (possibly four) states in the list combined, although, taken together, they had something like three times her population and about three times her wealth. From a common sense standpoint such a ranking procedure is similar to that of a physician who would attempt to pronounce upon the health of a man by examining only the lungs and the digestive and excretory organs with no attention to the heart or circulatory system.

It is only fair to state that part of the extraordinary ratings assigned to Wisconsin came about because of a misunderstanding of the data in the state reports to the United States Bureau of Education which were used for the report. Here common sense would have led one to suppose that staffs of state departments of public instruction lost the services of members assigned to war service and had changes in personnel which would make the reports on this period at best somewhat doubtful. Common sense would also have avoided adding in the total number of teachers for Milwaukee (something over 10 percent of the teaching staff of the state) while omitting in some of the calculations all the expenditures for their salaries, which are naturally the highest in the state. Certainly, common sense would have suggested that school data collected for the year 1918 with all the disruption of school systems in that year, ought to be *visèd* before publication by the only persons competent to eliminate such an error. If only the common sense device used by Flexner in his study of medical schools for the Carnegie Foundation had been used, much of the trouble could have been cleared up before publication. Flexner's study was practically impregnable because he was able to say that his every statement about a medical school had been submitted to the school in question and this school had been given full opportunity to disprove it or to demonstrate what modification ought to be made before publication.

It is only fair also to state that the Ayres report accomplished considerable good by focusing attention upon the plain facts that Wisconsin does not spend enough money upon her public schools and does not secure a good enough school attendance. But the failure to allow for the elements mentioned resulted in more use of the report by politicians, educational factions, and spiteful busybodies than by school men.^{4a} Had the report been able to

^{4a} Since this address was delivered, the defeat of Superintendent Cary of Wisconsin for re-election in a campaign in which this report was extensively used against him, furnishes an interesting example of the uses to which such a report may be put. Although

withstand the common sense test, it would have been worth several times as much to us in Wisconsin.

In a recent number of the JOURNAL OF EDUCATIONAL RESEARCH there appeared

A list of states whom use of tests hath blest

And lo, Wyoming's name led all the rest.⁵

As we are always on the watch in Wisconsin to analyze the secrets of success elsewhere in order that we may better our own work, we looked into this situation. According to the article the states were ranked on the basis of "systematic use of standard tests in cities of ten thousand population or over." Wyoming had a rating of 80 percent on this, counting five cities as in this class. The large number of such cities in Wyoming seemed unusual and the back of the well-known book company calendar credited the state with only one city that large in 1920. Later it was found that the ranking had been made from data given in a previous article in the same journal by another writer who had attempted no such ranking. The latter, in addition to writing to cities of 10,000 or over, sent letters in the country at large "to a few cities of less than 10,000 population where there was special reason for thinking that research work had been provided for." Every precaution may have been taken to safeguard this procedure scientifically so that all states would be fairly treated in this supplementary list. It, however, resulted in adding four cities to the original one city of Wyoming. If additional cities for Wisconsin had been chosen on the basis of the same extension of census limits alone, at least twenty additional cities would have come in for this one state. The addition of the small cities in the manner used may be explained and possibly justified to trained measurement men save

carefully labeled "An Index Number for State School Systems," the study was popularly known throughout the state simply as "The Ayres Report." The defeat of Superintendent Cary by 29,939 votes in a total of 385,003 appears in the light of careful inquiry by the writer to be due to the determined opposition of three groups: (1) rural taxpayers disgruntled over the state superintendent's condemnation of disreputable school buildings and his agitation for living salaries for teachers; (2) powerful parochial school organizations representing two faiths; (3) manufacturers who raised a large campaign fund against him because he uncompromisingly opposed exploitation of the regular public school system by employers interested primarily in vocational training.

No one of these three groups has ever been accused of desiring to increase taxes for regular public schools or attendance at them. Yet only by increases in these two items could the state's standing in the report possibly be raised, no matter who was state superintendent or what his policy might be. ⁵ *Journal of Educational Research*, 3:72.

for the distortion liable to be caused by running component percents on very small groups. But the ordinary man looking at the matter from a common sense standpoint is not apt to see this. In his mind, to balance the addition of four cities for Wyoming, cities would have to be added by the dozen for some other states.

The measurement movement is facing a serious problem in regard to the common sense likely to be exhibited by many of the new measurement workers. The leaders in the movement so far have in the main been men and women of considerable actual experience in teaching who later added their measurement equipment. They have thus been able to make valuable interpretations and applications of their measurements. Now, however, the educational institutions are sending out many youngsters highly trained in measurement technic but sometimes woefully ignorant of the school work which they are attempting to measure. The more gifted of these will, of course, soon recognize their limitations and in time will undoubtedly overcome this handicap by hard work. But where many of them will get the common sense necessary to make their interpretations and pronouncements really valuable is indeed a problem.

3. *Too little constructive help is given after tests.*—Probably no experienced measurement worker would claim for a minute that public school systems should do any measurement on their own account except for constructive supervision. Some superintendents, of course, do measurement work in their schools for their graduate theses; but most of these sincerely believe that they are materially bettering the regular school work by such studies. Every progressive school system expects to share in aiding fruitful measurement research carried on by the higher education agencies in its territory. But even here the expectation is that the results will be sufficiently valuable to the local system to justify the time given to the work. Most of the measurement literature in the JOURNAL OF EDUCATIONAL RESEARCH stresses the view that measurement is merely for results whose interpretations and applications are of material aid to the schools tested.

But notwithstanding all these good intentions, in altogether too many cases the measurement work stops short of giving the expected help to the schools tested, and certainly it stops short of making adequate recompense for the expenditures on the work. In Wisconsin, for instance, in some counties supervising teachers are devoting much of their time to visiting teachers who are giving

tests. Then they stay in the office to work up the results which they send to the inexperienced girls in the rural teaching positions. Much of this work is extremely valuable. But the public in many places is not yet convinced that it can produce better results than the same time expended in demonstration teaching by the supervisor, in observing the teacher's work, and in giving the latter helpful personal suggestions and criticisms. From all over the country come reports of so much testing by some teachers that insufficient time is left for the actual teaching. An intelligent and progressive city superintendent in all sincerity recently remarked that he could not see why so much testing was done for silent reading work when measurement workers say there is a very high correlation between silent reading ability and intelligence. That is, he had not seen that the testing had resulted in more than saying that the naturally intelligent children would do the best silent reading anyway. At our Wisconsin City Superintendents' Convention last October, a very capable superintendent, one who tries to keep up with every school improvement, said publicly that the testing for silent reading and the emphasis upon securing better results in it seemed likely to end in dropping literature and the oral reading necessary for the appreciation of poetry and the finest prose almost wholly out of the course of study. In his thinking the loss of an appreciation of literature could not be offset by any gain in silent reading for mere information. At a conference some time ago a leading educator expressed doubt as to the value of so much testing for promotion purposes when a very high correlation has been shown between the results of good intelligence tests and the opinions of competent teachers as to which children should be promoted. No doubt the skilled measurement workers have excellent reasons for their procedure and can, fairly easily, answer such objections. But the point here is that such objections from thoughtful people ought to be guarded against in advance as much as possible.

These and similar observations of competent practical school men indicate the great work yet to be done in emphasizing that the interpretation and application of results are of chief importance. Part of the difficulty doubtless arises from the comfortable definiteness of the mechanical processes involved in the measurement work. Most teachers are like most people; they do not care for the strain involved in what we call creative or purely original work. Interpretations, applications, and definite outlining of

remedial measures form the hardest kind of work, a kind actually painful to many people. But the tests are worked out with such explicit directions by the makers that the giving of tests, scoring, and compilation of results are routine work necessitating little real mental effort. The teachers are perfectly willing to devote any amount of time to this and really think they are achieving something. Whether this is really the case or not, all measurement workers need to measure their own efforts to see what actual help comes to the schools from it. And they will need to convince the public that this help is an adequate return for the expenditures involved. This should be a fairly simple matter for it seems only reasonable to suppose that a measurement worker should be able to evaluate and improve his own work more easily than can any other kind of school man.

4. *The style of presentations of measurements for the public should be radically different from that for fellow measurement workers.*—Probably no one would contend for a moment that the style ought to be the same for the two groups. Certainly the National Association of Directors of Educational Research would not. They have already made a distinction between their association meetings and their open meetings. They also know that the public as a whole has only about the reading ability of a fifth-grade child. But the fact remains that there are still too many measurement bulletins and measurement sections of surveys which appear to have been written with one eye on fellow workers and the other eye on the public. Such publications, unless very skillfully presented, can influence the average taxpayer only as he has respect for something which he thinks is beyond him. Such an attitude on his part is not apt to make him advocate more money for the work.

In this connection we may take advantage of the experience of the United States Department of Agriculture and of the various university extension organizations. These long ago found that the style of matter intended for the public must be radically different from that for fellow scientists. These organizations issue bulletins for scientists and then interpret and explain the same things in public bulletins of a very different nature. In educational work there are a few examples like the publications of Dr. Ayres for the Russell Sage Foundation which are effective with both groups. But in the main, the practice of separate publications is much better.

Form elements in material for the public merit special emphasis. Presentations for the public should translate statistical results by taking advantage of ideas already understood by the average man and by utilizing purely local illustrations. Many people have the essentials of statistical ideas ready for measurement workers to utilize. Thus the speaker a year or two ago ran across an old deer hunter who was talking of the refusal of some city hunters to wear red caps or coats. They said it was dangerous because far more men were shot who wore red than who did not. The old hunter had the correct statistical idea when he remarked that because practically all deer hunters wore red, more wearers of red would be sure to be shot anyway. Again, in Birmingham, Alabama, years ago someone laid down the regulation that the passing mark in any class was to be 10 percent below the class average calculated from grades on a scale of one hundred. The author of this rule, and all teachers following it, had certain very important statistical ideas all ready for measurement work to start with.

Spending energy on translating measurement results into forceful images familiar to the local public is profitable work. Thus in Wisconsin, in securing support for county training schools last year, we showed that the typical tax burden for county support was the price of one egg per thousand dollars of assessed valuation for each year. This year, in order to have finer divisions, we have employed the price of milk to the farmers at the condenseries. Thus we have been able to show that in one very wealthy county, the county training school has cost the equivalent of one-half pint of milk per thousand dollars of assessed valuation for the year. This fall a Wisconsin county superintendent, in a county where many miles of cement road are being built, discomfited the advocates of low school taxes by pointing out that the cost of rural schools in his county for the year was just equal to that of two miles of cement road.

Time is not available for an extended treatment of other useful matters of form, which have been treated at length elsewhere by the speaker.⁶ But certain items merit listing. For public presentation, each statistical table should preferably express but one idea. The printing should be easily read from one position. The print should be large enough to avoid eye fatigue, especially on the part of older and influential taxpayers. The data in tables should be

⁶ Alexander, Carter. *School statistics and publicity*.

shifted from an alphabetical or other purely arbitrary arrangement so as to bring out their sequences. Forceful graphs and pictures may be used to illustrate definite points and should be so labeled as to be easily intelligible by themselves. Material so labeled is of special value for lantern slides to be used in presenting measurements at various public meetings. The tables in the educational reports of the Russell Sage Foundation are excellent models for this. It is well to note that advertisements, which often contain statistical matter, use graphs very sparingly. In much measurement publicity the best results will probably be secured by a series of brief presentations issued at intervals, each fairly complete in itself but forming an essential part of a well-planned whole. If the whole presentation must be printed at one time, the conclusions and recommendations should be printed at the first with the extended proof in later sections. An admirable example of this is the recent study by Dr. G. H. Reavis.⁷ The first twenty-five pages are very interesting and stimulating to the average man. The statistical foundations for these statements, elaborated to suit the most exacting statistician, appear in subsequent sections.

IV. AN UNDERDEVELOPED FIELD

According to an editorial by Terman, "History shows that when poverty-stricken schools face insistent demands for higher efficiency the result is likely to be a development along the lines of inner organization, method and procedure."⁸ Our public schools with their rapidly increasing demands for money are in many places poverty-stricken, or they soon will be. On all sides we feel insistent demands for higher efficiency in school work. Measurement work will play the leading rôle in the inner development sure to take place. But such development at best can accomplish little compared to what may be done if reasonable increases in school support can also be secured. Measurement workers are prepared as are no other school men to present educational needs to the public so that better school support may be obtained. But the measurement energy so far has mainly attacked problems of inner development. The members of this association of course desire to be true educational patriots. To attain this wish, they must do their fair share of the fighting necessary to secure better school support.

⁷ *Factors controlling attendance in rural schools*. (Teachers College, Columbia University, Contributions to Education, No. 108.)

⁸ *Journal of Educational Research*, 1:138.

SCALE OF ATTAINMENT NO. 2.—AN EXAMINATION FOR MEASUREMENT IN HISTORY, ARITHMETIC, AND ENGLISH IN THE EIGHTH GRADE¹

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I. EXPERIMENTAL DEFINITION OF THE PROBLEM

The examination described in the present paper is the result of an effort to formulate a scale for investigating achievement in the fundamental subjects, in the last year of grammar school. In particular the writer has been interested in the possibility of comparing, by means of such a scale, graduation standards in different schools and school systems. There is, surely, need for such use of tests in defining certain important school requirements and standards. In reality, educational tests have been used to a surprisingly small extent in connection with actual practice in grade classification and disposition. In a sentence, the effort has been to devise an examination for measuring achievement in the fundamental subjects, primarily for the purpose of defining final grammar-school standards in these subjects. The scale is therefore intended for use in investigating the finished product of the elementary school training.²

In the construction of such an examination the first consideration was, of course, as to what might be the fundamental subjects which should be covered. A test in American history and civics appeared unquestionably necessary. A test in mathematical reasoning, or problem-solving, also seemed essential. A test in geography was not included, as geography frequently does not appear in the eighth-grade curriculum. The real problem arose in attempting to measure ability in English—in reading, literature, composition. In fact, the situation, as regards measurement in

¹ Studies from the Psychological Laboratory of Indiana University.

² As Scale of Attainment No. 1 and the accompanying first-grade reading vocabulary scale were intended to investigate the first steps in that training (see Pressey, L. W., "Scale of attainment no. 1—an examination of achievement in the second grade," *Journal of Educational Research*, 2:572-81, September, 1920; and Pressey, L. W. and Skeel, H. V. "A group test for measuring reading vocabulary in the first grade," *Elementary School Journal* 21:304-9, December, 1920).

this field, was felt to be so ill-defined that two considerable pieces of preliminary research were undertaken, before the final form of the examination was decided upon.

The first question was as to whether a test of ability in silent reading should be included in this "battery." From one point of view such a test was irrelevant to the problem. The aim was to measure achievement in the "promotion" subjects; and silent reading did not so function as a recognized entity in the curriculum—as an explicit factor conditioning a child's "passing" or "failing." But if ability in assimilative reading were so pervasively all-important as is sometimes asserted, then recognition of that fact in a proportional emphasis upon measurement of silent reading ability, in the writer's estimation, would appear desirable. A critical investigation of the situation was decided upon.

The results of this investigation have already been reported,³ and require only brief summary here. The findings suggested that after freedom from oral reading habits had once been attained, ability in assimilative reading was largely specific to the particular subject matter and vocabulary dealt with. The findings should certainly be considered tentative until verified by other investigators; and it is hoped that other workers may be interested to study the same question with other materials, in order to determine the general validity of these conclusions. But meantime, the conclusions are by no means unreasonable. They are quite in

³ Pressey, L. W. and S. L. "A critical study of the concept of silent reading ability," *Journal of Educational Psychology* 12:25-31, January, 1921. The conclusion is simply that one reads understandingly in proportion as one is familiar with the vocabulary used, and with the general topic discussed, and is interested—which is surely plausible enough. And the factors conditioning the efficiency of silent reading with any type of matter would appear to be general intelligence and general habits of attention and methods of study. But these factors are not factors operating in assimilative reading merely, nor to be dealt with merely in that context. And (the contribution of this paper) these general factors appear to be proportionately less important than has usually been supposed, as compared with the specific elements of vocabulary, background information, and interest. Further, it is these specific elements which would seem most readily dealt with by the school. Perhaps the writer's point of view does not seem to be, in the last analysis, so different from the usual understanding of the situation. But in the emphasis, and particularly in the pedagogical implications, there is a decided difference. Especially is the importance of developing an adequate reading vocabulary stressed, in this reconstruing of the problem. And a different approach, in efforts at measurement of the factors involved in assimilative reading, is suggested.

keeping with what is known about the specific nature of most functions. And, taken in connection with the fact already mentioned that "silent reading" has not yet won explicit recognition in the usual curriculum, the findings seemed adequate to warrant the exclusion of a test of "silent reading ability" from the examination. Instead, a vocabulary test was included, on the hypothesis that vocabulary was an important element in assimilative reading, that size of vocabulary might anyhow be highly correlated with ability in "silent reading," and that increase in size of reading vocabulary might be considered one important result (perhaps the important result) of the work in "literature."

The second problem had to do with measurement of ability in English composition. It would obviously have been possible to obtain, as part of the examination, a brief composition, as a sample of each child's ability in written work. In fact, the first plan was that the last page of the examination folder should be left blank, and that on this last page should be written a composition which should be rated by the Willing scale.⁴ But since the examination was intended primarily for extensive survey work and for use by teachers, a method which was so laborious and so subject to the personal equation of the scorer, seemed hardly practicable. Moreover, the writer felt that certain factors, tending to make results so obtained highly unreliable, had not been adequately investigated. It is known that judges may differ strikingly, in the ratings they assign to a given composition, when using any one of the standard scales for measuring merit in English composition.⁵ But very little is known as to the extent to which different compositions written by the same child may vary in merit, according as that child might be interested in one topic and not in another, might be alert on one day but weary on another, might occasionally be distracted by chance circumstances which did not trouble at other times.

⁴ Willing, M. H. "The measurement of written composition in grades IV to VII," *English Journal* 7:193-202, March, 1918; or see Monroe, W. S. *Measuring the results of teaching*, pp. 235-43.

⁵ See for instance Kelly, F. J., *Teachers' marks* (Teachers College Contributions to Education, No. 66, 1914), pp. 108-32; Hudelson, Earl, *Second conference on educational measurements*, Indiana University, 1915, pp. 115-22; Gordon, Kate, "A class experiment with the Hillegas scale," *Journal of Educational Psychology* 9:511-14, November, 1918.

The results of an investigation of this problem will shortly be published.⁶ It need only be said here that compositions written by a given child on different themes, at different times, and in different forms of discourse, may vary greatly in merit. And when all these factors, making for unreliability, are taken into account, it appears that ratings by the usual method, on a single composition from each child, cannot but be highly unreliable as measures of the ability of the individual child, and distinctly inadequate as a basis for class or school comparisons.⁷ Various tests of ability in written English were, therefore, tried. And after considerable experimentation a test of "good usage" in written English, and a vocabulary test, were decided upon. These tests in combination appeared to give an excellent indication as to ability in written English. The correlation of the combined scores with estimated ability in written English was 0.72 for a large eighth-grade class. They appeared also to have considerable value for diagnostic purposes; the good usage test covered elements of "form value," while the vocabulary test investigated the equipment in verbal material, which a child had available for purposes of expression. At least these hypotheses seemed plausible, and the tests sufficiently valuable to be worth trial in such an examination as the writer contemplated.

To summarize then: the preliminary experimentation suggested that a test in American history, a test in arithmetical reasoning, a test in reading vocabulary, and a test in "good usage" in written English, should make an examination giving a very good appraisal of attainment in the fundamental subjects, in the last year of grammar school. The tests may now be briefly described.

⁶ Pressey, S. L. "A critical study of the problem of measurement in English composition," to appear in an early number of the *Journal of Educational Psychology*. The correlation between merit in a narrative composition and merit in a descriptive composition (as rated by the same experienced judge) was 0.32; a total of 102 cases, all the eighth-grade children in a large departmental school, were dealt with.

⁷ For instance, very careful estimates were obtained from the teachers in English, history, and geography, for the children in the eighth-grade class already referred to. The correlations between the average of these estimates, for each child, and ratings on the narrative composition made by an experienced judge, was only 0.29! It may be argued that this low rating was due in large part to the unreliability of the teachers estimates. However, the writer was able (as will appear shortly) to obtain, with two "diagnostic" tests in English, a correlation of 0.72, with these same estimates, for these same children!

II. THE TESTS AND CERTAIN MATTERS OF TEST FORM

The directions, and first five lines, of the vocabulary test run as follows:

TEST I. READING VOCABULARY

Directions.—Below are some statements such as:

To be weary is to be: tired lazy dull quick

Here the word which correctly defines "weary" is "tired," so "tired" has been underlined. The statement now reads, "To be weary is to be tired," which is true. In each of the statements below you have four choices for the correct word, in just this way. One, AND ONLY ONE, is right. This correct word you are to underline, just as "tired" is underlined in the example. If you cannot be sure, guess. Work as rapidly as you can.

1. A dungeon is a room in a: cathedral prison store museum
2. A gable is a part of a: house book feud cataract
3. A token is a: remembrance thought epigram anecdote
4. An abbot is an officer of the: army navy state church
5. A gnarled tree is: smooth young rough leafy

The entire test consists of forty such lines. The words were selected from the glossaries of three eighth-grade readers; the forty lines finally used were selected from a large number of such lines tried in the preliminary experimentation. The items finally used were arranged in order of difficulty and scaled on a probable error scale.⁸

⁸ No attempt was made at a systematic selection of every tenth word, or otherwise so that interpretation in terms of total vocabulary might be possible. The value as well as the legitimacy of such a procedure is surely doubtful. In the present instance the first effort was simply to pick words which seemed of about the desired degree of hardness and of some importance with regard to one's literary vocabulary, and which easily combined into synonyms and confusion words, for the purpose of the test.

It should be said that each one of the tests used was made up from a large number of items which had been tried with a large eighth-grade class (composed of some one hundred and fifty pupils). The form was made up from this first trial, was then tried with a second eighth-grade class of about the same size. And the final form is a revision of this last trial. The writer wishes in this connection to express his indebtedness to Superintendent E. E. Ramsey and to Miss Mary Kerr, Principal of the Bloomington Departmental School, for their cooperation in the preliminary trial and to Superintendent E. W. Montgomery and Miss Dorothy Moran, Principal of the Bedford Departmental School for their cooperation in the further experimentation with the tests.

The first five lines of the second test—Good Usage—were as follows:

1. The boys have ran away. I've fell lots of times. I rang the bell.
We was on time.
2. He developed great speed. He is a foriegner. He gave me a receipt.
This is a cereal story.
3. The snow and ice has melted. I've got to go. I done all of them.
Should I do this?
4. He said, "Come here!" He said to "come quickly". He said; Look
there! They shouted "Catch him?"
5. She don't see me. She was lying down. Donald's got my knife.
What does those words mean?

The directions require the children simply to find in each line the one sentence which is in all respects correct, and to underline this sentence. The test consists of forty such lines. The odd-numbered lines deal with errors in grammar; the even-numbered lines with mistakes alternately in spelling and in punctuation. The grammatical errors were made up from various grammar tests, chiefly from Charters' Diagnostic Tests; but Starch's test was also used as well as the test material given in Sherwin Cody's "Commercial Tests and How to Use Them" (World Book Company, Yonkers, New York). The misspelled words are from "Jones' Spelling Demons." The punctuation comes largely from Starch and Cody with a liberal sprinkling of original items.

The third test was the history test. The first five lines follow:

1. The people who settled in Plymouth were: Dutch English French
German
2. The Quakers settled in: Quebec Maryland Vermont Pennsylv-
vania
3. The Spaniards explored America chiefly to obtain: furs gold
trade land
4. A colony made up of debtors was founded in: Massachusetts Geor-
gia New Hampshire Maryland
5. The Indians who lived in the western part of New York were called
Iroquois Narragansetts Chippewas Sioux

The children are told simply to underline the correct response in each line. The tenth, fifteenth, twentieth, twenty-fifth, thirtieth, and thirty-fifth questions have to do with the Constitution and organization of the government. The lines were made up from Hahn's admirable scaled series of questions in American history,*

* Hahn History Scale for grades 7 and 8. Address H. H. Hahn, Wayne State Normal School, Wayne, Nebraska.

but with the use also of Van Wagenen's scales,¹⁰ the Bell and McCollum Scale¹¹ and with reference also to a number of standard school histories. The proportioning, through the different periods, is according to the number of pages devoted to each period, on the average, in three such histories. It should be added that no effort was made to include "thought" questions; it was assumed that questions dealing with historical information would indicate with a considerable degree of satisfactoriness ability in historical thinking as well.¹²

The first five lines of the fourth test—arithmetical reasoning—are given below:

1. A dealer pays \$18.00 for 9 chairs. The amount paid for each chair was: \$3.00 \$4.00 \$2.50 \$2.00
2. James counted 55 animals in a field; 25 were cows. The rest were sheep. The number of sheep was: 30 20 25 75
3. If an arithmetic and history together cost \$1.25 and the history costs 75c, the arithmetic must have cost: 25c 50c \$1.00 85c
4. If you are in school 5 hours each day, 5 days in the week, the number of hours you spend in school per week is: 20 10 25 15
5. A paint box costs 65c. If I give the dealer a half dollar and a quarter, my change will be: 10c 13c 25c 5c

The test consists of forty such items. The directions are simply to underline, in each problem, the correct answer. The test covers more or less systematically fractions, percentage, interest, mensuration, ratio, and proportion. Again, the number of items devoted to each one of these topics is roughly in proportion to the amount of space devoted to them in certain standard arithmetics. Incidentally, it should be noticed that with this form of presenting arithmetical problems ability in problem-solving is very largely kept separate from mere skill in the fundamental operations. The form of the test would seem of some interest as an effort toward such analysis.

¹⁰ Van Wagenen American History Scales. Bureau of Publications, Teachers' College, Columbia University, New York.

¹¹ Bell, J. C. and McCollum, D. F. "A study of the attainments of pupils in United States history," *Journal of Educational Psychology*, 8:257-74, May, 1917.

¹² Buckingham, B. R., "Correlation between ability to think and ability to remember, with special reference to United States history," *School and Society*, 5:443-49, April 14, 1917; "A proposed index of efficiency in teaching United States history," *Journal of Educational Research*, 1:161-71, March, 1920.

The children are allowed seven minutes each on the first and third tests and twelve minutes for the second and fourth. The arrangement of the tests on the blank embodies a new feature of some interest. The second test is on the last page of the four-page folder; the third test is on the second page; and the last test is on the third page. The blanks are passed out upside down, so that the children cannot read the printing on the first page. After the blanks have all been given out the direction is "Turn your blanks around! Fill in your name, age and grade at the top of the page. Now read the directions for the first test, and do what they tell you to do." Then at the end of seven minutes the examiner says, "Stop! Simply turn your paper over, so. (Illustrate) to the back page. . . .; do *not* open the folder. The test is named Good Usage. Read the directions for this test and do what they tell you to do." At the end of twelve minutes the examiner again says, "Stop! Open the blank at the middle (illustrate) and fold it back so that the history and arithmetic tests are outside. Lay the blanks down on the desk so that the history test is up. Now read the directions for this test and do what they tell you to do." Such handling of the blank, the writer has found, gives quite as good control of timing—prevents looking from one test to another—as printing alternate pages upside down, putting directions for the next test on the following page with directions and material separated, or other elaborate and artificial methods.

The blank thus consists simply of a four-page folder, each page the size of an ordinary typewriter sheet. The blank being thus simple, the materials are comparatively inexpensive.¹² The tests are essentially "self-giving." The examination can, therefore, be given by the average teacher without the slightest preparation except that involved in glancing over the folder, and the accompanying brief statement as to timing and as to handling the folder. The examination is very easy for the children to take, especially because of the very high degree of unification. For example, the directions are essentially the same for each test and the response is the same, namely, the underlining of the correct element. Finally, the scoring is exceedingly easy. The blanks are inside out when they are passed in by the children; that is, the

¹² The blanks with all materials are now being sold by the Department of Psychology, Indiana University, at \$1.50 per hundred.

second and third pages, on which are the third and fourth tests, are exposed to view. The third test should be scored first, followed by the fourth. The blanks for each class or room should then be put inside each other, the whole set turned right side out and the first and second tests scored. The total score on the examination is simply the sum of the scores on the four tests. After a little preliminary practice it is possible to score the entire examination and to obtain this total score at an average rate of less than three minutes per blank.¹⁴

The examination is, then (1) inexpensive, (2) easy to give, (3) easy to take, (4) easy to score. These four practical requirements for ready usability are, the writer feels, distinctly to be considered—and not sufficiently considered in much recent test building.

Tentative norms for the total examination are presented below:¹⁵

Grade	No. cases	25-percentile	Median	75-percentile
VIII	482	65.6	77.0	89.0
VIII-B	134	55.1	65.3	78.0
VIII-A	126	68.0	78.5	89.0

¹⁴ A word remains to be said with regard to the use simply of total crude score, in summarizing results on the total examination. It is a rough-and-ready procedure, of course; and it over-weights English about 60 percent. But English is important enough to deserve to be over-weighted. And so far as the rough-and-readiness is concerned the writer feels very decidedly that any elaborate statistical treatment in combining such scores is usually not worth the time and trouble it takes. Examinations in which crude scores are rehandled as many as six times are now in use. But such complication increases at least sixfold the likelihood of error. There is surely a question as to whether the original accuracy of the tests is sufficient to warrant such nicety of treatment. The writer once knew a student who carried out an elaborate experiment in which he obtained measurements on a chronoscope to thousandths of a second. And the final calibration showed that his chronoscope was only accurate to tenths. Even the best of present-day tests are distinctly unreliable. Under the circumstances, elaborate exactness in the treatment of results is simply statistical pedantry.

¹⁵ The examinations were given in January, just before mid-term promotions.

The writer wishes to express his obligation to Superintendents N. F. Hutchison of Huntingburg, Indiana; F. G. Neel of Winamac; Owen Neighbours of Wabash; W. F. Vogel of Boonville; A. D. Montgomery of Edinburg; and to Mr. E. E. Keener, Director of Measurements in the Richmond (Indiana) Schools, for their kind cooperation in obtaining these data. The norms for the A and B grades separately are from Richmond only. The data for the eighth grade as a whole are somewhat heterogeneous, including two systems with yearly promotions only, and one system with A, B, and C divisions.

For each test, the medians in order run as below:

Grade	Test			
	Vocabulary	"Good Usage"	History	Arithmetic
VIII	20.0	14.8	20.6	22.2
VIII-B	15.8	13.0	16.7	20.4
VIII-A	21.2	15.6	20.1	22.2

The above norms for the separate tests, rather than the total scores, are, of course, the important figures.

III. THE USES OF THE EXAMINATION

The writer now wishes, very briefly indeed, to indicate the possible ways in which such an examination can be used.

1. In the first place, it may be used to compare schools within a given system. The writer has before him results from a certain school system, having five ward schools. In "Total Attainment" one school shows only 30 percent of its children above the median for that city. Another school has 63 percent above that median. Surely the eighth grades in these two schools are not strictly comparable; nevertheless these two schools are in this same system, the two classes are both eighth grades, and both groups are about ready to finish grammar school and to be certified as ready for high school. It is further interesting to know that the poorest school is particularly deficient in history and is comparatively best in arithmetic.

2. Such an examination may be used, in the second place, to compare different systems. Of two small systems of comparatively the same size, the first system shows 74 percent of its eighth graders above the median for the second system (the seventh-grade median of the first system is almost identical with the eighth-grade median of the other). And it is particularly interesting in this connection that the poorer system excels the other in arithmetic. Apparently "figuring" has been emphasized in the first school at the expense of the less formal work.

3. However, a third and much more important matter, from a practical point of view, does not have to do with the averages or central tendencies of the different groups at all. The more im-

portant questions are as to what the graduation requirements of these different schools may be, as to what they demand of a child if he is to be certified by them as having completed the work of the common schools, and as to how poor a child must be before he is failed in a given subject. These matters are, the writer feels, important enough to receive consideration in a separate study. They involve an effort definitely to relate results in tests with important school practices; and, incidentally, they involve some curious and interesting statistical problems. Data dealing with this matter, for the eighth-grade classes included in the present study, will be presented later.

SUMMARY

1. The paper presents an examination for measuring achievement in the "promotion" subjects, in the last year of the elementary school, and for comparing graduation standards.

2. Preliminary investigation led to the omission of any measure of "silent reading" from the examination, and to the attempt to investigate ability in English composition by means of tests in vocabulary and in "good usage" in written English. Besides these two tests, tests in American history and arithmetic reasoning were included.

3. Tentative norms for the examinations as a whole and for each test are presented.

4. Some data are presented indicative of the usefulness of such a scale (a) in comparing different schools within the same system; (b) in comparing different systems; and (c) in comparing graduation standards from school to school and system to system.

THE RELIABILITY OF TEST SCORES

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Many methods have been used in measuring the reliability of tests. By reliability is to be understood the extent to which the test measures that which it in reality does measure—not necessarily that which it is claimed to measure. Each method has been followed because of some feature of simplicity of use, of interpretation, of result, of real or fancied accuracy, etc. From the variety of methods used, it is plain that all too frequently the desire to secure a measure of reliability which would be comparable to measures obtained by other workers with similar tests has been absent. The methods indicated by the following propositions have all served more or less successfully.

Other things being equal, of two tests designed to measure some trait, that one is the more reliable:

I. That gives a distribution of scores in greater agreement with the known or probable distribution of the trait;

II. That gives the least overlapping between two groups of individuals known to be far apart in the trait;

III. That correlates the more highly with other independent measures of the trait (this, of course, is more than a mere measure of reliability);

IV. Whose exercises are more equally spaced upon a scale of difficulty;

V. That is the longer (in the sense of containing more examples of the same type);

VIa. That correlates the higher with a second form of the test as similar to the first as possible without containing identical elements (self-correlation);

VIb. That results in individual scores whose probable errors, when expressed in terms of a measure of deviation of the group examined, are the smaller;

VIc. That results in individual scores whose probable errors, when expressed in terms of the deviation of some standardized group, are the smaller;

VI_d. That results in individual scores whose probable errors, when expressed in terms of the difference between two standardized groups, are the smaller.

Methods VI_a, VI_b, VI_c, and VI_d are all dependent in the sense that if one is known and the definition of the group upon which it is based is also known, then each of the others can be obtained. This, however, may be a very tedious task, and these procedures are not of equal simplicity of interpretation, so that they do not have equal merit as measures of reliability. Without attempting an adequate discussion of each of these nine methods, the following brief observations are made.

I. This is an entirely inadequate method and probably would never be used were not the requisite distributions available.

II. This is a good method if two tests endeavoring to measure the same thing are to be compared, and if the two groups used in determining the reliability of the first test are identical with (or known to be closely similar in talent to) the two groups used in the second instance. This method is really but another way of accomplishing the end described in VI_d, but it does not permit of the accuracy and objectivity of interpretation and statement that is possible in the case of the VI_d method.

III. If a measure correlates very highly with known measures of capacity, it must of necessity have a fair degree of reliability, but as the converse is not true—that if a test has high reliability, it will correlate well with a valid criterion—correlation with a good criterion should be used as a measure of validity and not of reliability. The need of knowing the reliability of a test has been questioned, since the practical problem is not primarily to secure tests of high reliability. It is of no import to measure accurately some trivial capacity, but it is of great moment to secure tests, the scores in which are highly reliable indexes of ability in some known and important capacity. Expressed in statistical terms, if r_{1c} is the correlation between a test and a sound criterion, and r_{12} the correlation between one form of the test and a second form (the usual reliability coefficient), what matters the value of r_{12} if r_{1c} is satisfactory? For purposes of accuracy of estimating criterion scores, knowing test scores, it matters not at all whether r_{12} is known or not; but for purposes of understanding the similarity between the functions measured in the test and those

involved in the criterion, r_{12} must be known. The highest possible correlation which can be obtained (except as chance might occasionally lead to higher spurious correlations) between a test and a second measure is with that which truly represents what the test actually measures—that is, the correlation between the test and true scores of individuals in just such tests. These true scores may be defined as the average scores of individuals upon a very large number (an infinite number) of just such tests. This correlation between a single test and the true score in the trait measured by a single test is equal to $\sqrt{r_{12}}$.¹ This is, then, the maximum correlation which can ever be obtained (except as a matter of chance) with the test. If this is low, it frequently answers all the questions involved. If $r_{12}=0.25$ so that $\sqrt{r_{12}}=0.5$, it would be ridiculous to continue to use the test without lengthening, or otherwise improving it, in a problem which requires for valid results a much higher correlation with a criterion.

Again, suppose it has been determined from a very large population, thus obviating the factor of chance, that $\sqrt{r_{12}}=0.50$ and that $r_{1c}=0.50$. This exceptional case, only possible when the criterion is perfectly reliable, would mean that the test score, in so far as it was not due to chance, exactly paralleled the criterion in its significance. In such case it would only be necessary to increase the length of the test to secure more and more nearly perfect measures of the criterion.

Suppose the $\sqrt{r_{12}}=0.50$ and $r_{1c}=0.40$. The interpretation of this situation depends upon the reliability coefficient of the criterion. Let us first suppose that it is perfectly reliable. Then the fact that r_{1c} is less than 0.50 is conclusive proof that some of the traits which are truly measured by the test are not identical with elements of capacity involved in the criterion. These elements (of habit, memory, or what not) should be searched out and eliminated or the test will continue to measure something in addition to the criterion. This "thing in addition" could conceivably involve the same elemental traits as the criterion, but not in the same proportion.

Generally, however, the criterion is not one of perfect reliability, so that the interpretation is not so simple. If r_{cc} is the reli-

¹ Kelley, Truman L. "A simplified method of using scaled data for purposes of testing," *School and Society*, 4: 34, 71, July 1, 8, 1916.

bility coefficient of the criterion, then $\sqrt{r_{cC}}$ is the maximum possible correlation with it (except as a matter of chance). In this case the maximum value which r_{1c} can have (this maximum reached when no elements except chance other than those involved in the criterion are involved in the test score) is $\sqrt{r_{12}} \times \sqrt{r_{cC}}$. To illustrate, suppose r_{cC} is equal to 0.64, then $\sqrt{r_{12}} \times \sqrt{r_{cC}} = 0.40$. Now, if r_{1c} also equals 0.40, then the best results possible of anticipation are obtained; that is, all the factors of which the test score is a measure are (1) either factors likewise measured by the criterion, or (2) chance factors. Now, suppose r_{1c} is less than 0.40, say equal to 0.30. With reliability coefficients as given, namely $r_{12} = 0.25$ and $r_{cC} = 0.64$, it must be that at least to a degree the test score is not in its significant portion merely a measure of what the criterion measures.

It is therefore apparent that in order to answer the really important questions in regard to the test and what it measures, it is necessary to know not only the correlation with the criterion, but also the reliability of the test and, what is unfortunately seldom known, the reliability of the criterion.

IV. This is a very indirect measure of reliability. The principle, however, is important in the matter of the derivation of a test.

V. This principle has long been known and widely used. Suppose there are n similar tests and the average score upon all of these tests is taken as the score for a single individual, then, if r_{12} (the correlation between one of these tests and a second) is known, it is possible to estimate the reliability coefficient of the score which is the average of n tests. Let us designate this correlation between the average scores upon n tests and n other similar ones by r_{nN} . Since the particular n tests averaged to obtain the first score are different tests, though similar to the same number averaged to obtain the second score, the correlation is designated r_{nN} instead of r_{nn} , which latter would imply that the same tests were given twice. The symbol r_{nn} may well stand for the correlation between retestings with the same material, whereas r_{nN} is the correlation between scores based upon similar material. Brown's formula gives r_{nN} in terms of r_{12} .

$$r_{nN} = \frac{n(r_{12})}{1 + (n-1)r_{12}}$$

n may be integral, fractional, greater than 1, or less than 1. The excess of r_{nN} over r_{12} measures the increase in reliability in passing from a single test to another similarly constructed but n times as long.

VIa. As mentioned in III, the greater the self-correlation of a test the more reliable it is. The reliability coefficient is, however, not an entirely satisfactory measure of reliability, for it is affected by the distribution, in the trait measured, of the particular group studied. To secure a reliability coefficient of 0.40 from a group composed of children in a single grade is probably indicative of greater, not less, reliability than to secure a reliability coefficient of 0.90 from a group composed of children from the second to twelfth grades. If it is reasonable to assume that in terms of true ability the spread of talent is four times as great in the eleven grades as in a single grade, the correlation in the second case would need to be 0.914 in order to indicate as close a relationship as that shown by a reliability coefficient of 0.40 in the single grade. The following formula² gives the relationship:

$$\frac{\sigma_i}{\sigma_T} = \frac{\sqrt{r(1-R)}}{\sqrt{R(1-r)}}$$

σ_i and σ_T are the standard deviations of the two groups in terms of true ability, and r and R are the reliability coefficients of the two groups. Solving this equation for the case in which $\sigma_T = 4\sigma_i$ and $r = 0.40$, gives $R = 0.914$.

If the standard deviations of scores in two groups are known, it is not necessary to make any assumption; for then the following formula applies:

$$\frac{\sigma}{\Sigma} = \frac{\sqrt{1-R}}{\sqrt{1-r}}$$

In this formula σ and Σ are the standard deviations of the scores in the two groups and r and R the reliability coefficients respectively. In passing, it may be noted that this equation is an excellent criterion for determining whether a test is equally effective in a range Σ as in another range σ ; for if the relationship just given does not hold within the probable error of the determination, it is evidence that higher correlation is found in one part of the range than in another.

² For the derivation of this formula see p. 377 at the close of the article.

In spite, therefore, of the very real merits of the coefficient of reliability, it does not permit of direct comparison in case the groups examined are of different ranges of talent.

VIIb. The reliability coefficient may be used to determine a probable error of an individual score, and this measure is, of course, entirely independent of the range of talent upon which the calculation is based. It is, of course, desirable that this population be large enough so that chance errors will be small. Let x_1 and x_2 be the scores expressed as deviations from their respective means in two forms of a test; σ_1 and σ_2 the standard deviations of these forms (presumably practically equal); and r_{12} their reliability coefficient. Then if x_1 -scores are estimated from x_2 -scores, there will be discrepancies between the estimated x_1 -scores and the x_1 -scores actually obtained. These discrepancies are called residuals, or errors of estimate. The standard deviation of them is given by the following equation:³ $\sigma_{1,2} = \sigma_1 \sqrt{1 - r_{12}^2}$. The probable error of estimate is $0.6745 \sigma_1 \sqrt{1 - r_{12}^2}$. Usually, however, it does not particularly concern us to know how closely it is possible to estimate x_1 -scores from known x_2 -scores. The fact which we particularly wish to know is how closely we can estimate true scores (true scores defined as before, as the average scores which individuals would make if tested under similar conditions upon a very large number of such forms). The standard error in estimating true scores from x_2 -scores is equal to $\sigma_1 \sqrt{1 - r_{12}^2}$. Otis and, more recently, Monroe have shown that this is also equal to $\frac{\sigma_D}{\sqrt{2}}$ in which σ_D equals the standard deviation of differences

between $\frac{x_1}{\sigma_1}$ and $\frac{x_2}{\sigma_2}$ scores.

There are thus two methods (one involving the calculation of the correlation between tests and the other the calculation of the standard deviation of differences) whereby to calculate the standard error of estimate. The probable error of estimate is, of course, $0.6745 \sigma_1 \sqrt{1 - r_{12}^2} = \frac{0.6745}{\sqrt{2}} \sigma_D$. The practical advantages in measuring reliability by the smallness of the errors of estimate lie in (1) their simple interpretation, and (2) their

³ For the derivation of this formula see p. 379 at the close of the article.

independence of range of the talent examined; for if the test is equally excellent throughout a wide as a narrow range, except as influenced by chance, $\sigma\sqrt{1-r_{12}}$ for one range equals $\Sigma\sqrt{1-R_{12}}$ for a second range. Their disadvantage lies in the fact that they are dependent upon the units which happen to be those of the test, and direct comparisons of different tests cannot be made. If the probable error of estimate in the case of the Alpha reading test is 5 alpha units, and the probable error of the Beta reading test is 20 beta units, it is not known which is the more reliable until some equating of the units has taken place. Two methods of doing this are here proposed:

VIc. It is possible to define a group in such terms that a second investigator could approximately duplicate it, for example, "unselected English speaking twelve-year-olds." If the measure of dispersion of this group (say its standard deviation) is taken as the unit, and if errors of estimate are expressed in terms of this denominator, the reliability of tests claiming to measure the same capacity can be directly compared and the reliability of tests measuring quite different capacities can probably be compared with considerable validity and much significance.

VIId. It is possible to define two groups, for example unselected children of two different ages, and to take the difference between the means of the two groups as the unit. The writer proposed at the February 1920 meeting of the National Association of Directors of Educational Research at Cleveland that the difference between the mean scores of unselected twelve-year-olds and thirteen-year-olds be accepted as a unit, and that the probable error of estimate of tests be expressed in terms of this unit. This has the very great advantage of being easily interpreted. If, for example, the probable error of the estimate of a test is 0.75 in terms of this unit, it means that the probable error of a placement of a child in the capacity measured by the test is 0.75 of a year's growth in the case of children twelve to thirteen; and that the probable error is in the neighborhood of the same amount in terms of years for children somewhat below or above this age.

Simplicity of interpretation strongly recommends this method, but inequality of rate of growth in different capacities makes direct comparison of different functions in terms of this unit not entirely sound. Furthermore, the probable error of the determina-

tion of this unit based upon a certain number of pupils of ages twelve and thirteen would be much greater than the probable error of a unit equal to the standard deviation of a distribution of the same number of 12.5-year-olds, as is apparent by reference to the formulas for the probable errors of these magnitudes. The age group twelve to thirteen is recommended because elementary, intermediate, and high-school tests can all be given to this age group, and because probably as large a percent of this age group are to be found somewhere in the school system as of any age group. Accordingly, if all twelve-year-olds in the school system are tested, a fair approximation to an unselected group is obtained.

This paper has been written with a view to showing the need of a standardized procedure in measuring the reliability of the tests which are in use, and with the hope that it will encourage such study and discussion as will lead to a unified practice. Whether the particular practice recommended is adopted is secondary to the establishment of a common procedure.

DERIVATION OF THE FORMULA, $\frac{\sigma^2}{\sigma_T^2} = \sqrt{\frac{r(1-R)}{R(1-r)}}$

Consider two forms of the same type of test, each designed to measure a given ability. Suppose that these two forms have been given to N pupils whose range of talent is narrow and to the same number of pupils whose range of talent is wide. Call the measures obtained from the first and second forms (expressed as deviations from the mean) the x_1 's and x_2 's respectively. Then r_{12} is the correlation between the two forms, or it is the reliability coefficient. Call the standard error of estimate of the x_1 scores from the true scores, $\sigma_{1.2}$. Then $\sigma_{1.2}^2 = \sigma_1^2 (1 - r_{12})$.⁴

Similarly, when the two forms of the test are applied to the wider range of talent, we may write (designating the constants by capital letters)

$$\Sigma_{1.2}^2 = \Sigma_1^2 (1 - R_{12})$$

Now, if the test is equally effective in the wide and the narrow range of talent, then the two errors of estimate are the same and $\sigma_{1.2} = \Sigma_{1.2}$. Or, $\sigma_1^2 (1 - r_{12}) = \Sigma_1^2 (1 - R_{12})$. Whence, dropping the subscripts,

$$\frac{\sigma_1}{\Sigma_1} = \frac{\sqrt{1-R}}{\sqrt{1-r}} \dots \dots \dots \text{Formula (1)}$$

Now, suppose that instead of having two forms of the test, we have n forms where n approaches infinity. Then the true measure of the ability of

⁴ Cf. derivation (below) of the formula $\sigma_{1.2} = \sigma_1 \sqrt{1 - r_{12}^2}$

each pupil is the mean of his score obtained from the n forms. Then for N pupils and n forms, we have the following scheme:

PUPIL	SCORES EXPRESSED AS DEVIATIONS FROM THE MEAN				MEAN OR TRUE SCORES
	1st Form	2nd Form	3rd..... n^{th} Forms		
1	x_1^I	x_2^I	x_3^I	x_n^I	$\frac{x_1^I + x_2^I + x_3^I + \dots + x_n^I}{n}$
2	x_1^{II}	x_2^{II}	x_3^{II}	x_n^{II}	$\frac{x_1^{II} + x_2^{II} + x_3^{II} + \dots + x_n^{II}}{n}$
3	x_1^{III}	x_2^{III}	x_3^{III}	x_n^{III}	$\frac{x_1^{III} + x_2^{III} + x_3^{III} + \dots + x_n^{III}}{n}$
4	x_1^{IV}	x_2^{IV}	x_3^{IV}	x_n^{IV}	$\frac{x_1^{IV} + x_2^{IV} + x_3^{IV} + \dots + x_n^{IV}}{n}$
.
.
.
.
N	x_1^N	x_2^N	x_3^N	x_n^N	$\frac{x_1^N + x_2^N + x_3^N + \dots + x_n^N}{n}$

Since the "mean or true scores" are expressed as deviations, the mean squared deviation equals the sum of the squares of these scores divided by N ;

$$\begin{aligned} \text{Or, } \sigma^2 &= \frac{1}{N} \left[\left(\frac{x_1^I + x_2^I + x_3^I + \dots + x_n^I}{n} \right)^2 + \dots + \left(\frac{x_1^N + x_2^N + x_3^N + \dots + x_n^N}{n} \right)^2 \right] \\ &= \frac{1}{N} \left(\frac{\sum x_1^2}{n^2} + \frac{\sum x_2^2}{n^2} + \dots + \frac{\sum x_n^2}{n^2} + \frac{2\sum x_1 x_2}{n^2} + \frac{2\sum x_1 x_3}{n^2} + \dots \text{to } \frac{n(n-1)}{2} \text{ terms} \right) \\ &= \frac{1}{n^2} \left[\left(\frac{\sum x_1^2}{N} + \frac{\sum x_2^2}{N} + \dots + \frac{\sum x_n^2}{N} \right) + \left(\frac{2\sum x_1 x_2}{N} + \dots \text{to } \frac{n(n-1)}{2} \text{ terms} \right) \right] \end{aligned}$$

$$\text{But } \frac{\sum x_1^2}{N} = \sigma_1^2, \frac{\sum x_2^2}{N} = \sigma_2^2, \text{ etc.}$$

$$\text{And } \sum x_1 x_2 = N r_{12} \sigma_1 \sigma_2$$

$$\text{Whence } \frac{2\sum x_1 x_2}{N} = 2r_{12} \sigma_1 \sigma_2 \text{ and likewise for other paired values.}$$

$$\text{Hence } \sigma^2 = \frac{1}{n^2} \left[(\sigma_1^2 + \sigma_2^2 + \dots + \sigma_n^2) + (2r_{12} \sigma_1 \sigma_2 + \dots \text{to } \frac{n(n-1)}{2} \text{ terms}) \right]$$

But $\sigma_1 = \sigma_2 = \sigma_3$, etc.

Therefore, $\sigma_r^2 = \frac{1}{n^2} \left[n\sigma_1^2 + 2\sigma_1^2(r_{12} + r_{13} + \dots \text{to } \frac{n(n-1)}{2} \text{ terms}) \right]$

Since the series, $r_{12} + r_{13} + \dots$ to $\frac{n(n-1)}{2}$ terms, may be replaced by the

mean of its terms times the number of terms, $\sigma_r^2 = \frac{1}{n^2} \left[n\sigma_1^2 + 2\sigma_1^2 r \frac{n(n-1)}{2} \right]$

where r is the mean of the separate intercorrelations.

Whence $\sigma_r^2 = \sigma_1^2 \left(\frac{1}{n} + r - \frac{r}{n} \right)$

But since n approaches infinity, $\frac{1}{n}$ and $\frac{r}{n}$ approach zero.

Therefore, $\sigma_r^2 = \sigma_1^2 r$.

By the same reasoning we obtain for the wider range of talent, $\Sigma r^2 = \Sigma_1^2 R$. Substituting the values of σ_1 and Σ_1 as obtained from these equations in Formula (1), we have

$$\frac{\sigma_1}{\Sigma_1} = \sqrt{\frac{r(1-R)}{R(1-r)}} \dots \dots \dots \text{Formula (2)}$$

DERIVATION OF THE FORMULA, $\sigma_{1.2} = \sigma_1 \sqrt{1-r_{12}^2}$

This formula may be derived as follows: Let x_1 equal the dependent variable and x_2 the independent variable. Then the formula for estimating the value of the dependent variable when that of the independent variable is known is $\bar{x}_1 = r_{12} \frac{\sigma_1}{\sigma_2} \bar{x}_2$. (This, of course, is the usual regression equation.

\bar{x}_1 is the value of the dependent variable obtained from the equation.) Letting x_1 stand for any obtained value of the dependent variable, $(x_1 - \bar{x}_1)$ is the error of estimate. The extent of this error may be expressed as the mean sum of the squares of expressions like $(x_1 - \bar{x}_1)$ —in other words, by the square of the standard error of estimate. Calling this standard error of estimate $\sigma_{1.2}$, we have

$$\begin{aligned} \sigma_{1.2}^2 &= \frac{\Sigma (x_1 - \bar{x}_1)^2}{N} \\ &= \frac{\Sigma (x_1 - r_{12} \frac{\sigma_1}{\sigma_2} x_2)^2}{N} \\ &= \frac{\Sigma x_1^2 - 2r_{12} \frac{\sigma_1}{\sigma_2} \Sigma x_1 x_2 + r_{12}^2 \frac{\sigma_1^2}{\sigma_2^2} \Sigma x_2^2}{N} \end{aligned}$$

But

$$\frac{\Sigma x_1 x_2}{N \sigma_1 \sigma_2} = r_{12}$$

Therefore,

$$\Sigma x_1 x_2 = N r_{12} \sigma_1 \sigma_2$$

Substituting for $\Sigma x_1 x_2$ its value, we have

$$\begin{aligned} \sigma_{1.2}^2 &= \sigma_1^2 - 2r_{12}^2 \sigma_1^2 + r_{12}^2 \sigma_1^2 \\ &= \sigma_1^2 (1 - r_{12}^2) \end{aligned}$$

Therefore,

$$\sigma_{1.2} = \sigma_1 \sqrt{1 - r_{12}^2}$$

Editorials

THE SCHOOL BULLETIN¹

Educational workers in every section of the country were not only shocked but keenly disappointed when their eyes fell upon the first page of the December, 1920, issue of the *School Bulletin* and read these words: "This is the final number of the *School Bulletin*." This journal was founded by C. W. Bardeen of Syracuse, N. Y., forty-six years ago, and has been owned and edited by him since its establishment. It was a successful and influential educational journal. It was a profitable business enterprise. There are many who would have paid well for this paper, had they been able to purchase it. It would have been a good investment. Why did its owner discontinue it instead of passing it on into other hands?

The answer is that the action was thoroughly characteristic of the man who controlled it. The life of the *School Bulletin* is the life of C. W. Bardeen and the life of Mr. Bardeen is the life of the *School Bulletin*. For nearly half a century this journal was a leading factor in the development of the public educational system of the state of New York. Through this paper Mr. Bardeen expressed his opinion upon the educational problems of the day and especially upon those peculiar to the Empire State. The paper has stood out prominently as an expression of Mr. Bardeen's individual judgment on educational problems. His policy has always been to support educational measures and reforms which he believed would improve educational practice and procedure. When he favored a proposition he gave it whole-hearted support. When he opposed a measure he was equally whole-hearted in its condemnation. He maintained the same attitude toward men which he did toward measures. When he believed in a man, his support of that man was assured and proved a source of great strength. His censure of men in whom he did not believe was as severe as his pen could indite.

¹ At our request Doctor Thomas E. Finegan, State Superintendent of Public Instruction of Pennsylvania, contributed this fine editorial on the passing of a periodical whose long and influential career made its discontinuance an event in educational history.

Mr. Bardeen's educational philosophy was sound. He could be counted upon the right side of every great question. The *School Bulletin* will prove to be, in the years that follow, the most authoritative source on the history of education in the state of New York that will be found. This journal has made a large contribution to the development of American education. That contribution is Mr. Bardeen's individual achievement. He evidently wanted that achievement to stand as a memorial to his service. He refused to commercialize it. He is right, and should be commended for his decision. It required courage, but of all the numerous qualities in his character there was none more characteristic than his courageous spirit. The last issue of the *Bulletin* is proof of this fact.

The *Bulletin* will be missed by thousands of teachers to whose interests it was devoted. Its editor's versatility and sense of humor made the paper a professional companion. The editor put much of his philosophy of life into the paper and in this way cheered and encouraged thousands of teachers when the loads which they were carrying seemed almost overwhelming. The writer recalls a time many years ago when he had nearly decided to abandon educational work, but the persuasive arguments of Mr. Bardeen induced him to remain in it.

Having known Mr. Bardeen intimately for more than twenty-five years and having read the *School Bulletin* religiously for thirty-six of the forty-six years of its existence, I am able to place an appreciation upon its service and to express an estimate of the loss which the readers of the *Bulletin* will feel in the discontinuance of this live, interesting, and helpful journal. I can also assure Mr. Bardeen of the appreciation which men throughout the Union have of his service to public education and the sympathy and regret that they feel for the injury² which came to him and which makes it necessary to unload part of the burdens of his active and busy life. His philosophy is so sound and sane and is so well expressed in a personal letter which I recently received from him that I have obtained his permission to quote the following from that letter:

² In October, 1920, Mr. Bardeen, who is seventy-three years of age, suffered an injury to his right foot which necessitated amputation below the knee. The letter to Doctor Finegan, a portion of which is quoted below, was written in February, when Mr. Bardeen was convalescing after the operation.

"After six weeks in the hospital I have got back home, with a range at present of the chair and the bed. But this losing a foot is not so serious. I reflect a dozen times a day how much worse it would have been to lose a hand, and appreciate more and more how fortunate I am that it is below the knee. In college the boys used to sing:

'Saw my leg off,
Saw my leg off,
Saw my leg off—
Short!'

Like many undergraduate ambitions this showed lack of sagacity; it is much better to have it cut off long.

"I keep getting astonishing information as to similar losses that are unsuspected; the president of the City Bank, for instance, whom I know well and who never limps or carries a cane, has a wooden foot. I am promised my own artificiality shall be equally unnoticed, but unfortunately I can't get it attached until the skating season is over. There has been no pain worth speaking of, and though a hospital bed is tedious, since I have been allowed to sit up and read I have been quite comfortable, have had a good appetite, and am so well that the doctors agreed the other day that the rest had done me good and that I was the better for the operation. However, when I asked them if, when it did me so much good to have one foot off they advised me to saw off the other, they did not respond."

A BOOK OF INTERVIEWS

The Book of Cases which was recommended by the editor in the January issue as a means of studying methods of teaching is valuable. But cases observed and recorded with the care which he outlines are difficult to obtain. So, in the meantime, I propose a book of interviews which, while not as accurate as the case reports, will be of value as suggestions for the improvement of methods of teaching.

Teachers are much more willing to tell what they do than to describe it on paper. In every school system there are enough good methods to provide the inexperienced teachers with all they can use, methods which under normal conditions are buried in the individual minds of the teachers who use them and are, therefore, wasted so far as everyone except the owner is concerned.

Through the interview these methods become the common property of the system, for by the process of pooling, the individual possessions of each become the common property of all.

The plan of collection is very simple. It consists of four steps. First, the difficulties which teachers have must be selected with great care on both a quantitative and qualitative basis. It is important that these difficulties be made as specific as possible; and it is better to have the difficulties expressed in terms of the seventh grade or of the first grade than in general terms of the whole elementary school.

The second step is to select thirty or forty of the best teachers in the system who have successfully handled the selected difficulties. Here again seventh-grade teachers and first-grade teachers should be selected in connection with the seventh-grade problems and first-grade problems.

The next thing of importance is to train interviewers and detail them to find out and record how these successful teachers correct the difficulties in question.

Finally, the answers to each of the questions should be compiled and in such a way as not to lose the details. By such methods it is entirely practicable to obtain a number of valuable suggestions upon any topic upon which teachers have had expert experience.

These collected methods do not always have the certainty of established results; and occasionally different teachers use opposing methods. But, in some cases, the situation in which one teacher follows a method may not be identical with other situations in which it is desired to use it. Again, a teacher may tell what he thinks rather than what is the case, or what he ought to do rather than what he does. It must also be assumed that since the methods are not evaluated they are to be used as suggestions and not as established methods of procedure. But in spite of these shortcomings the collective experience of the best teachers in attacking a problem presents a mine of suggestions which are not all found in books. These methods are particularly valuable because they meet the concrete difficulties of the school room in concrete ways and are described by teachers in the vocabulary of the schoolroom.

W. W. C.

THE EDITORIAL BOARD, OR WHO CHANGED THE FRONT COVER

Our Editorial Board has engaged attention recently through its tendency to change itself. More recently and somewhat consequently we have been obliged to consider the topic suggested in the second part of our title.

We alluded in our News Department some months ago to the fact that Doctor Ayres had withdrawn from the directorship of the department of education of the Russell Sage Foundation. We hoped at that time that, although he was taking up financial work, his interest in education would seem to him to justify his continuing as an associate editor of the JOURNAL OF EDUCATIONAL RESEARCH. After taking the matter under advisement, however, he decided to resign. As a member of the board of editors, Doctor Ayres was particularly interested in the field of child accounting. His resignation, therefore, left an important department of educational investigation without adequate editorial supervision. At this juncture, however, Professor E. J. Ashbaugh, who is already a member of the board by virtue of his office as Secretary of the National Association of Directors of Educational Research, consented to give such attention to child accounting as might be required. We are very fortunate in securing the services of Doctor Ashbaugh for this purpose, and we feel sure that his willingness to assume double duty will be appreciated by our readers. Perhaps, however, those who are not members of the research association do not realize the extent of Doctor Ashbaugh's activities. We feel justified in suggesting to such persons that they look at the last few pages of each number of the JOURNAL and observe the competent way in which the department devoted to the association is being conducted.

As we announce the resignation of Doctor Ayres and the assumption of the department of child accounting by Doctor Ashbaugh, we also desire to announce that Doctor Guy M. Whipple, Director of the Bureau of Tests and Measurements of the University of Michigan, has accepted an invitation to become a member of the Editorial Board. As to a specialty, Doctor Whipple will naturally have something to do with tests; and so far as he does this, he will add his efforts to those of Doctor Monroe and Doctor Terman in this field. In a more general sense Doctor Whipple will undoubtedly bring strength to the

JOURNAL. His large editorial experience in connection with other journals and as secretary of the National Society for the Study of Education gives him a peculiar fitness for this type of work. The JOURNAL is exceedingly fortunate to be able to enlist the services of Doctor Whipple.

But we are neglecting our second topic. What we started out to say was, "Have you seen our new cover page?" Perhaps not. We suspect that a rather large proportion of our readers may belong to the tribe of the unobserving—to the domestically unsatisfactory clan who fail to notice a new rug on the living-room floor or new dishes on the dining table. If you belong to this clan, we fancy you will now turn back and note our new spring attire. However, we wish to express the hope that we shall have no more changes in our Editorial Board. The members of the board will naturally suppose this is because we value their services. Such is indeed the case, but we ask them to consider the fact that another resignation will necessitate another plate. Although the present changes have given us a chance to make a new appearance, we hope the members of the board as it is now constituted will stay with us indefinitely if for no stronger reason than to save the expense of engraving the names of their successors.

B. R. B.

Reviews and Abstracts

E. H. CAMERON, *Editor*

BURGESS, W. RANDOLPH. *Trends of school costs*. New York: Russell Sage Foundation, 1920. 142 pp.

This monograph shares with the monograph of Dr. Ayres on *An Index Number for State School Systems* a distinct position in the development of educational inquiry. Dr. Burgess' problem is evidently to give some fundamental information concerning the amount of increase which ought to be made in school budgets in order to secure the same amount of educational service as was obtained in years just prior to the World War. In order to do this he brings to bear the history of costs upon the problem.

Historical statistics are relatively new in education. Experience in that field has not been recorded in quantitative form and under uniform classifications for a long period of years. Accordingly, the important lessons which may be derived from "trends," as Dr. Burgess happily calls them, have been confined to those fields in

which practical workers as well as investigators early saw the need for systematic record-making. In economics, for example, we are able to trace the development of the volume of imports and exports in various countries, the fluctuations of wealth and taxation, the variations in birth, marriage, and death rates, the mutations of exchange rates and bank clearings, because practical business or the laws of civilized countries have a long time demanded that these data be reported in comparable form. If it is profitable in business to know the fundamental facts underlying business conditions and to know them in a time series, it is no doubt equally important to know in the same way the fundamental facts underlying education. In addition, therefore, to the definite and helpful facts which Dr. Burgess brings out in his book, we note with pleasure the success he has had in bringing to light a few significant items on which he can furnish evidence over a long period of time. In the first place, he shows the fundamental facts of children in attendance and of expenditures for education in the public schools of the country since 1870. He brings out graphically the development of these items in this half century by means of trend lines, or lines of closest fit to the detailed curve.

Observing that expenditures for salaries (including wages) and outlays for sites, buildings, and equipment constitute about 80 percent of the total school expenditures, and that salaries alone constitute nearly two-thirds of the total, he concludes that the investigation of the trend of salaries is decidedly the most important investigation in school expenditure. He is able to carry this inquiry over a period of 80 years, using quotations (twenty per year) for the same localities. During this period—1841 to 1920—weekly salaries increased as follows: for men teachers in rural schools, from \$4.15 to \$26.75; for women teachers in rural schools, from \$2.51 to \$17.68; for men teachers in city schools, from \$11.93 to \$60.61; and for women teachers in city schools, from \$4.44 to \$35.61. During the past five years teachers' salaries (all types of service combined) have increased 45 percent. These increases are large, but as a matter of fact, they substantially parallel the increases during the past five years for laborers and artisans.

On the basis of the weekly budget of a typical wage-earner's family the curve for the cost of living was plotted for the same period. From about 1875 to 1915 teachers' salaries were a little above the cost of living. From 1915 to 1920 the situation was reversed, and the cost of living not only passed the teachers' salaries but increased twice as rapidly. "In 1918 and 1919 the teacher could buy fewer of the necessities of life than at any time in 40 years. The situation is improved in 1920 but the same statement may still be made truly. The considerable advances in teachers' salaries within a year have thus far brought them back only about two-thirds of the distance that they fell." The author adds, "There seems good reason . . . to believe that adequate adjustment to new price levels will be made. It should be realized, however, that only a good beginning has been made in effecting that adjustment. The major part of the task is still to be carried through."

With further reference to the relation of the salaries of teachers to the wages of artisans and laborers, the author points out that since 1915 the average wage of artisans and laborers has increased twice as much as that of teachers, and that "in relation to the laborer the average woman teacher was in 1918, 1919, and 1920 less well off financially than at any other time since the Civil War." It is thus evident that from the two important points of view of cost of living and the wages of other workers, the standard of living among teachers is not as high relative to that of others in gainful occupations as it has been in the past.

Dr. Burgess also investigated the trend of building costs. Summarizing his findings, he concludes that "in spite of considerable economies school buildings . . . are actually costing fully three times as much as before the war."

Thus the author brings from afar an overwhelming weight of evidence to bear upon his conclusion, which is essentially that "the same items of school expenditure will cost roughly twice as much in 1920 as in 1915." He notes in this connection that this statement "does not allow for any increase in school efficiency, or in school accommodations." He might have added—and did in fact imply—that it does not allow for any increase in school population. On the point of whether prices and wages will fall the author had recourse to his experience sheets as developed for the past 80 years. He observes that after the Civil War prices receded very slowly, and concludes that we may expect some lowering of price levels within the next few years "but no return to pre-war conditions for many years if at all." As to wages and salaries he shows that after the Civil War "some wages receded a little but only after several years" and points out that "wages and salaries retain advances made." "At present," he says, "it is reasonably certain that a new salary level has been reached which is likely to be permanent. The experience of the past supports this reasoning, and today the factors making for the permanence of salary and wage increases are more powerful than ever before." His conclusion, therefore, that school budgets must be double the size of those of 1915 errs, if at all, on the side of conservatism.

As to the way in which this is to be done, Dr. Burgess has an exceedingly interesting final chapter entitled "Sources of Income." He points out that other sources of revenue than general property tax are either relatively non-productive or have been utilized as far as safety permits. Moreover, he asserts that present needs cannot be met by adjustments in city budgets. Other types of public service "cannot give way further for the expansion of education." It is his judgment not only that the real estate tax is the soundest provision for revenue but that in spite of large increases in the tax rate in recent years, there are no indications that the limit which real property can bear has been reached.

We find Dr. Burgess' book not only distinctive in its treatment of educational data but timely in the lessons it draws from the past for our guidance in the present.

B. R. B.

Proceedings of the High School Conference of 1919. (University of Illinois Bulletin Vol. XVII, No. 13) Urbana, Illinois, 1920. 313 pp.

A review of the *Proceedings of the High School Conference of November 20, 21, and 22, 1919* probably seems to be somewhat late. However, the unusual merit of a number of the contributions to secondary education recorded in the 1919 Proceedings justifies the publication of some comments at this time.

Professor H. A. Hollister, director of the conference, opened the 1919 session with a discussion of the general conference objective, "The Universalization of High School Education for the Children of All the People in Illinois." During the past few months there has been a great deal of discussion of the importance of high-school objectives as a means of assisting in curriculum reconstruction. A commission appointed by the National Education Association has set forth in a bulletin entitled "Cardinal Principles of Secondary Education" seven main objectives: health, command of fundamental processes, worthy home-membership, vocation, citizenship, worthy use of leisure, and

ethical character. Serious students of the problems of curriculum reconstruction will be interested in comparing with these seven objectives the four ultimate objectives proposed to the conference by Mr. Sandwick's committee, namely, health, wealth, association and beauty, the fundamental essentials to economic, political, and social life.

Probably the real life and spirit of the conference is developed in the section meetings. Certain it is that that part of the 1919 Conference Proceedings devoted to "Section Meetings" is unusually full of valuable contributions. In practically every section considerable attention was given to the discussion of the value of objectives as a means of curriculum reconstruction.

In the Administrative Section Mr. A. G. Capps, University of Illinois, presented an excellent article on the technic of curriculum construction. Seven general rules, formulated by Dr. Charters, were set forth as guiding principles. Mr. Capps has presented in his paper an analysis of the four ultimate objectives of secondary education as set forth by Principal Sandwick's committee.

High-school principals and teachers of the social sciences will be interested in reading Professor Judd's paper on social studies in the high school, presenting difficulties in the way of the introduction of social studies, together with a constructive program for the introduction of such studies.

Every year sees great progress in the application of scientific methods to the problems of education. Personal opinion is rapidly being replaced by decisions based on the scientific measurements of facts. In an article on "Intelligence Testing for the Classification and Guidance of High School Pupils" Professor Buckingham has pointed out the need and importance of intelligence tests. School superintendents and principals will be interested in the list of available group tests which Professor Buckingham has listed.

The "Project Method" of teaching probably has been more successfully used in agriculture than in any other subject. In fact, there are many who have come to the conclusion that the "Project Method" is one that has little value except in agriculture. A large part of the agricultural program was devoted to presentations and discussions of various projects. Perhaps the most successful of the high-school agricultural projects thus far reported is the project "An Experiment on Profit from City Bred Pigs" which has been carried on by R. W. Sutherland, a student in the Galesburg High School. Agricultural teachers will not only be interested in these various "projects," but they will find a valuable contribution on "The Point of View of the Teacher of Vocational Agriculture" by Professor G. A. Works of Cornell University.

In the Biology Section there seemed to be general agreement that the time has come for a rather complete reorganization of the course of study in biology. Much of what has been taught in biology in the past is not essential for high-school students. The present pressure for time requires the elimination of all non-essentials. Mr. H. D. Waggoner, Macomb, stated some of the difficulties in the way of reorganization and gave a clear presentation of the essential objectives in biology. Every teacher of zoology should read Miss Mabel E. Smallwood's contribution on "Fundamentals in a High School Course in Zoology." The points brought out in this paper are prerequisite to effective teaching in this field. Mr. J. L. Pricer presented a paper on "The Outlook for Biological Science in the Reconstruction of Secondary Education." There is included in the Proceedings Professor J. M. Coulter's talk on "Botany as a National Asset."

It seems unnecessary and out of place in a brief review to discuss in detail all the many valuable contributions to the various sections. It would be a mistake, however, to omit mentioning Arthur Bovee's "Teaching Vocabulary by the Direct Method," one of the most valuable contributions to the Modern Language Section for several years. The technic of teaching modern language has been radically changed since the general introduction of French during the World War. We hear much discussion of the "Direct Method." Mr. Bovee, University of Chicago High School, is a master in the use of this particular type of technic. Every teacher of French will find valuable aid in Mr. Bovee's article.

In general, the 1919 *Proceedings of the High School Conference* represents the most modern educational theories and the practice of teachers and administrators who are making a success in the educational field. Every teacher, principal, and superintendent will find material in the 1919 Conference Proceedings relating to his own special interest.

A. W. CLEVENGER

University of Illinois

BONSER, FREDERICK GORDON. *The elementary school curriculum*. New York. Macmillan Company, 1920. 460 pp.

A third book on the elementary school curriculum has appeared and reaffirms a "genuine need for a thoroughgoing, constructive revision of the curriculum." Other books or studies with a similar purpose are already in the making. All these studies are most welcome.

Professor Bonser acknowledges that a curriculum organized wholly upon a basis of *activities of life* is desirable, but recognizes that the present curriculum is thoroughly established upon a subject basis. An abrupt change would be impracticable, he maintains, and, therefore, he offers in his book "a mode of natural transition."

The first eight chapters are devoted to principles in curriculum making. In the next nine chapters the application of these principles is described. The concluding chapter tells how this book may be used in improving curricula. The first eight chapters center about the project method, especially discussed in chapter vi. "A project is a purposeful act. . . . The project method holds that the desirable and interesting life activities in which children spontaneously engage, or the activities in which they may be led to engage whole-heartedly and enthusiastically, should be the basis of all educational endeavor." The curriculum must thus be very closely related to life purposes and life activities.

In chapters ix to xiii and chapter xvi, Professor Bonser presents "projects" that may be used in each of the first six grades in teaching the school subjects, practical arts, geography, arithmetic, history, English, and physical education and hygiene. Such projects are not outlined for fine arts, music, and citizenship in the other three chapters in which these subjects are discussed.

This book will appeal strongly to the thousands of teachers into whose hands it will go—and go it will, because the title of this book interests thousands of grade teachers. And the book will contribute—somewhat—to progressive education.

To compromise between a curriculum that is "ideally desirable" and one that needs "thoroughgoing, constructive revision," is not the constructive contribution desired of our educational leaders. Our modern science of education is weakened by

such procedure. That an *abrupt* change from a curriculum of school subjects to a curriculum of life activities is neither desirable nor feasible need not forbid an educational leader proposing a definite program according to his very best standards. Adaptation to present conditions is another problem. Professor Bonser grants that a curriculum based on activities of life is desirable. He presents a "mode of transition," but leaves the reader in ignorance of the real curriculum to which such transition leads. This compromise leads to other weaknesses.

The project as a purposeful life activity, in which children engage whole-heartedly and enthusiastically, is debased, by this compromise, to essentially a *device* for teaching the schoolroom subjects. Just here Professor Bonser (and many other recent writers on phases of the "project method") pours new wine into old bottles with evil results. Current life activities *seem* with interest to the normal child. This situation the author recognizes. But the schoolroom subjects do not thus appeal to the child. What can be done? Eureka! Use the former as a means of teaching the latter. *And it works!* Note the "arithmetic" given by the author on pages 246-247, 248, 249, for grades IV, V, and VI respectively. Note how closely this "arithmetic" corresponds with that prescribed in most schools. Now examine the projects which the author lists in connection with the arithmetic. How strikingly evident that the "project," "a purposeful act," is used by the teacher as a method—a bait—by which to ensnare the interest of pupils and fasten it, for the time, upon that in which he has no normal interest. Professor Bonser's presentation of the project and its use in teaching the traditional school subjects stamps this book as a manual of method rather than a study of the curriculum.

The author's desire to compromise through a "mode of natural transition" has led him to some apparent contradictions. In chapter VI emphasis is placed upon a curriculum of purposeful activities—projects. The sequence of projects, he says, is determined by the interests and capacities of the pupils, and cannot be in accordance with a logical organization of school subjects. "*There are no life activities in subject matter as such*" (105). So far, so good! But in later chapters the traditional order prevails, as in the chapter on arithmetic: ". . . the sequence found in the usual text books in arithmetic will be approximated" (241).

Had the book been entitled "The Project Method Applied to the Traditional Curriculum," and the best part of chapter VI omitted, teachers would have had a very substantial and popular manual on *one method* of teaching. In that case the book would have been free from the adverse criticisms I feel bound to offer. The book will be generally well received. It will call forth more study on the "project method," on projects, on methods, and perhaps on the curriculum.

University of Missouri

J. L. MERIAM

TURNER, E. A. *The essentials of good teaching*. New York: D. C. Heath & Co. 1920. 263 pp.

Three distinctly different aims have determined the organization and content of recent discussions of methods of teaching. Some writers are interested primarily in telling teachers how to conduct recitations effectively. Consequently their discussions are full of helps, outlines, devices, and concrete suggestions concerning the best ways of securing desired results. A second group of writers are interested in reviewing the results of experimentation, and in interpreting these results in terms of

economical classroom procedure. A third group of writers believe that improvement in the art of teaching can be secured most effectively only when teachers have a thorough grasp of the basic principles of good teaching. They therefore center attention on those principles which underlie and explain the best practice. Each type of discussion makes a distinct contribution. The most helpful type for classroom teachers is one which utilizes fundamental principles, the results of experimentation, and concrete devices in the discussion of specific problems.

Professor Turner in *The Essentials of Good Teaching* aims "to lay bare the essentials of good teaching in a simple, concrete, and consistent manner in order to conserve the time and energy of teachers who are anxious for intelligent guidance in their teaching." At the very outset, he presents a comprehensive view of the prerequisites to a successful teaching act. These include a clear recognition of the social aim of education, the function and structure of subject matter, a knowledge of the reactive attitude of the child, a knowledge of appropriate stimuli, skillful control of stimuli, and enthusiasm for teaching. The essential points which are discussed agree very closely with the most progressive tendencies of the times. Each point is well supported by social, psychological, and philosophical considerations. More frequent reference to recent experimental results would have added materially to the objectivity of these discussions.

Along with the discussion of fundamental principles, considerable attention is given to concrete illustrations and applications. The discussions of the value and methods of comparison, the application of principles to reading, primary arithmetic, writing, and spelling, and the use of tests in improving instruction are especially pointed and effective. Inasmuch as the author has a wealth of concrete illustrations at his command, it is somewhat unfortunate that additional space was not available for a larger number.

The book centers attention on fundamental principles and stimulates independent thinking concerning the most significant classroom problems, and is probably best adapted to the needs of experienced teachers. It supplies a safe and sane philosophy of teaching, and can be used as a safe guide in reorganizing many phases of current instruction. On account of its simple style and its wealth of detail, the book is easily read and understood.

W. S. GRAY

University of Chicago

MCGREGOR, A. LAURA. *Supervised study in English*. New York: Macmillan Co., 1921. 220 pp.

The substance of this new book for supervisors and for teachers of English consists of many lessons, intrinsically interesting and highly suggestive, reported minutely from the practices of the English department of the Washington Junior High School, Rochester, New York. The writer, herself the supervisor of English and director of vocational guidance in the school named, reduces mere theory and pedagogical discussion to a minimum; she rests her case primarily upon an imposing array of concrete material, which she treats as illustrative of several innovating principles in the teaching of the mother tongue. Three principles apparently are uppermost in the author's conception: (1) abolishing the formal recitation and for it substituting laboratory procedure full of purposeful activity on the part of the pupils; (2) managing

the assignment of laboratory tasks so that each pupil, be he of low, of average, or of high ability, will be constantly working at his own maximum; (3) utilizing to the full, through socialized recitations and project teaching, the cooperative group impulses of adolescent children in grades VII, VIII, IX. In short, Miss McGregor has utilized the title *Supervised Study in English* in a somewhat larger sense than the one in which it is usually employed.

The first two chapters develop the meaning of supervised study as it has been set forth by McMurray, Erhart, Hall-Quest, and others, and apply it with special reference to the problems of English. Then in order follow chapters on oral English, on literature, on composition, on grammar, on special kinds of skill in English, and on the use of projects in English. Each chapter contains from five to ten sample lessons; for instance, chapter III on oral English contains among others a seventh-grade lesson in correct speech, an eighth-grade lesson in vocabulary building, and a ninth-grade lesson in library reference reading. Each lesson is divided into parts, review, assignment, and silent study predominating, with verification and socialized lesson appearing in some cases. To each of these parts is allotted a portion of the sixty-minute period appropriate to the subject matter concerned; the review is short, usually from ten to twelve minutes; the assignment varies greatly in length, from thirteen to thirty minutes, and averaging 40 percent of the class time; the silent study averages about twenty minutes.

One of the significant features of the lessons for students of education is the large variety of situations in which assignments are worked out on the basis of minimum, average, and maximum difficulty, together with a report in nearly every case, of the number of children who in the respective lessons were able to fulfill the different assignments. Minimum and maximum assignments are met usually by a minor part of the class; the average assignment by the greater number of the pupils. This distribution is not uniform, however. The pupil grouping in one VIII lesson in vocabulary building was minimum 4, average 13, maximum 18; evidently an easy lesson.

One who believes that the day of the formal recitation is past will find abundant comfort in the apparent reasonableness of Miss McGregor's contributions. He will find individualization of instruction, pupil initiative, project teaching, socialized recitation—in short, the laboratory emphasis and procedure—exemplified and illustrated in a hundred different ways. When these principles are applied universally, as apparently they are applied in Miss McGregor's English department, a new day will have come in the teaching of the mother tongue.

R. L. LYMAN

University of Chicago

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Walter S. Monroe, University of Illinois, Urbana, Illinois.

Schoolmen's Week at the University of Minnesota During the week of March 22 and March 26 a number of educational groups met at the University of Minnesota. The most important events of this meeting were the Eighth Annual Short Course for Superintendents and Principals, and the Fifth Annual Conference of Minnesota High School Teachers. In addition to local talent Professor E. L. Thorndike, Dean J. W. Withers, and Professor Charles H. Judd contributed to the program.

Michigan Conference on Educational Measurements The Bureau of Tests and Measurements of the University of Michigan held a conference at Ann Arbor on the evening of March 29. The program was devoted to the consideration of one topic: "The Classification of Pupils on the Basis of Intelligence Tests." School men from eleven Michigan cities were scheduled to make formal reports on this topic.

Educational Research in Ohio A bulletin of the Research Department of the Ohio State Teachers' Association for March, 1921, gives a list of the studies recently completed, or now in progress by 46 members of the department. Of these studies, 45 are reported as completed and 88 as in progress. If the large number of studies reported as being in progress are carried to completion the reports of this association will make a large contribution to our accumulation of knowledge in this field. The report is sent by Professor R. L. Morton of Ohio University, Athens, president of the department, and Superintendent F. J. Prout, Chillicothe public schools, secretary of the department.

The following program was announced for the joint meeting, on March 11, of the sections for educational measurements and for grammar grades of the Southern Wisconsin Teachers' Association.

Educational Research in Wisconsin *What About Grammar?* Superintendent E. G. Doudna, Wisconsin Rapids—30 minutes. *Discussion*—Professor F. L. Clapp, University of Wisconsin—15 minutes.

Utilising Intelligence and Achievement Tests for a More Effective Technique in Arithmetic—H. A. Cook, Principal of Junior High School, Merrill—25 minutes.

Individualisation of Instruction in Algebra and Elementary Mathematics—Mary A. Potter, Racine High School—15 minutes.

Improvement in Comprehension in Silent Reading—Prudence Cutright, Supervisor of Primary Grades, La Crosse—25 minutes.

Variability of Improvement in Spelling—Rose Gagen, Janesville—15 minutes.

Dean M. E. Haggerty of the University of Minnesota addressed the meeting of the association on "Service of General Intelligence Tests."

We continue to receive from China evidence of unusual interest in educational and intelligence tests. This interest is shown not only by the resident American teachers, but also by the native teachers. We received a letter a few days ago from Professor H. C. Chen of the Nanking Teachers College. Professor Chen says in part:

"Dr. S. C. Liao and myself have been working on educational and mental tests for the last year and a half. A book on mental tests will appear in Chinese in two months' time. It embodies thirty-five different tests. Eleven of them are our own work, and the rest are translations with modifications. Practically all of the tests have been tried in the Chinese schools, missionary or government. This work is of course tentative, but we hope to standardize these tests as time goes on.

"In addition, I have devised a number of Chinese language tests such as language completion tests, dictation tests, opposites tests, etc. As a preliminary step we used five tests for the last entrance examination of our college. The correlation between the tests and the average grades of the regular examinations was 0.39. It might have been higher, had we excluded the marks of the students in mathematics and Chinese language which, as I was told by the Dean of the College, were unscientifically graded and too difficult for the candidates."

Professor Chen enclosed with his letter a number of tests such as he is using. In addition to analogies, opposites, language completion, etc. there was a spelling test. We had supposed that the Chinese did not spell, yet here there are apparently—"apparently" is used with something more than common significance—twenty timed sentences. We are at least sure that there are twenty items of some sort.

The World Book Company has recently issued a brief bibliography of educational tests. Two hundred seventy-eight titles are listed. It is significant that a commercial firm has considered it worth while to compile such a bibliography. The World Book Company has rendered a distinct service by compiling and publishing this bibliography.

The influence of Dr. Ayres' method of investigation by means of an index number is seen in a monograph by Thomas E. Benner, statistician for the Alabama State Department of Education. The monograph is entitled, "A Comparative Study of the Elementary Schools, White and Colored, of the Sixty-seven Counties of Alabama." Ten items are used in appraising the schools of each county, and when the entries under the items are averaged, the general index number ranges for the sixty-seven counties from 38.0 to 75.2. The text accompanying the tables and charts purposely avoids technical terms and leaves the reader to draw his own conclusions. Mr. Benner says of the report: "So far as I know, this is the first time that both the white and colored schools have been measured—if the material of this study be accepted as a measurement—in terms of the same units for an entire state." We know of nothing to the contrary.

Houghton Mifflin Company announces a series of five tests under this title. They were devised by Harriet E. Peet, co-author of "Everyday Arithmetic," and Walter F. Dearborn, Professor of Education, Harvard University. There is one test on each of the four fundamental operations. **Progress Tests in Arithmetic** The fifth is a problem test. In each test there are several different types of exercises and they appear to be arranged in order of increasing difficulty. No measure of the rate of work is obtained. The authors state that the tests include the "leading difficulties that the pupils need to master." The tests are intended to supplement rather than to replace the tests of the type of Curtis Research Tests in Arithmetic, Series B, which yield measures of rate.

When the Picture Supplement Reading Scale by May Ayres Burgess appeared, it was obvious to those who had had wide experience with educational tests that detailed directions for scoring would be necessary if a high degree of objectivity was to be secured. No such directions were furnished by the author. Recently the Bureau of Tests and Measurements of the University of Michigan, which is supervising the use of this scale in Michigan, has issued a set of detailed directions for scoring it. These will doubtless be welcomed by all of those who have attempted to use the scale.

The Carnegie Corporation of New York has recently published the result of the Americanization studies to determine the provision for teaching English to non-English-speaking foreigners in our public schools. **Provision for Schooling the Immigrant** The following statements are quoted because they have a general interest:

"If an immigrant from a non-English-speaking country chooses to learn English in the public schools here, he must select with care the place of his residence in this country, for only one city in five has any public-schooling provision.

"It is evident from the statistics gathered that his chances of finding a school in any urban community increased 40 percent from 1914-1915 to 1918-1919; but he also has an eight times better chance if he goes to a place having more than 1,000 foreign-born residents than if he goes to one having less than that number.

"If he will also pick out a place having a population of over 25,000, he will have about seven chances in ten of finding public-schooling provision; on the other hand, he has one chance in ten in a town of less than 10,000 population."

At the Alumni Dinner held in connection with the meeting of the Department of Superintendence at Atlantic City, Dean James E. Russell announced the establishment by the Trustees of Teachers College of an Institute of Educational Research. **Institute of Educational Research** For the first time in the history of American education, the scientific investigation of education is to be undertaken on a basis comparable to that enjoyed by the research foundations devoted to science, engineering, and medicine.

The Institute is to be organized with Professor E. L. Thorndike as the Director of the Division of Educational Psychology, Professor Otis W. Caldwell as the Director of the Division of School Experimentation, and Professor George D. Strayer as Director of the Division of Field Studies.

The work of the Institute is to be supported by funds provided by the Trustees of Teachers College and by gifts supplied either by way of general endowment or for the purpose of conducting particular investigations. Funds have already been provided by the General Education Board for the work of the Lincoln School which will be a very important part of the Division of School Experimentation. This part of the enterprise is well under way under Dr. Caldwell's direction in the Lincoln School of Teachers College.

The Commonwealth Fund has made a grant in support of an inquiry concerning methods of learning. This investigation will be undertaken during the next year by Professor Thorndike. From the same source funds have been provided for a study of financing of American city school systems. This inquiry is undertaken in co-operation with the Committee for Chamber of Commerce Cooperation with the Public Schools under Professor Strayer's direction.

Relationship Between General Intelligence and Success in Certain High-School Subjects

During the school year 1919-1920, the writer gave the Alpha Army Test to the high-school students of the Omaha high schools. Significant intelligence differences were found among the three high schools. This was particularly true of Central High School and High School of Commerce where a difference of from 20 to 30 points between corresponding classes was found. These differences, as well as differences in social status and curricula of the two high schools, were pointed out in an earlier article in this JOURNAL.¹ Central High, it was found, received most of the students from the well-to-do and professional classes for classical and college preparatory courses; while Commerce High received most of the students from the laboring and less well-to-do classes for vocational training. The striking differences in the curricula of the two schools may be seen in the subjects listed in Table I.

With the differences mentioned above in mind, the writer considered two questions: (1) Do certain high-school subjects require greater general intelligence of the type measured by the Alpha Army Test than others? (2) Do the students less endowed in that type of intelligence do effective work in vocational subjects? To answer these questions the marks were given at the end of the first semester, 1920, obtained from both schools for the students who had been given the Alpha Test. The median intelligence score for the students who failed and for those who received passing marks was then found. This was done for a number of school subjects, and for the boys and girls of each class separately. The results appear in Table I.

From this table, it appears that greater intelligence is required for success in the subjects taught in Central High than for success in the subjects taught in Commerce High. It also appears that differences in the degree of intelligence required for success exist for the subjects taught within each school. In Central, Latin holds first place throughout the four classes. In the same school, manual training, mechanical drawing, typewriting, and bookkeeping are at the bottom in the classes in which they are given. The same consistency does not appear for the vocational subjects taught in Commerce High, although there is a tendency for typewriting and bookkeeping for the boys and sewing and cooking for the girls to occur at the bottom of the list. From this

¹ Madsen, I. N. "Group Intelligence Tests as a Means of Prognosis in High School," *Journal of Educational Research*, 3:43-52, January, 1921.

table it seems fair to conclude that general intelligence as measured by the Alpha Test is an important factor in a high-school pupil's success or failure. No doubt the results in these tables would have been more striking if other factors contributing to a student's success (such as emotional traits, school attendance, home conditions, etc.) were constant for all pupils.

TABLE I. COMPARISON OF MEDIAN INTELLIGENCE SCORES IN ALPHA ARMY TEST OF CENTRAL AND COMMERCE HIGH-SCHOOL STUDENTS FOR CERTAIN SUBJECTS SHOWING MEDIAN FOR PASSING AND FAILING STUDENTS

	Boys		Girls	
	Median Scores of Failed Students	Median Scores of Passed Students	Median Scores of Failed Students	Median Scores of Passed Students
FRESHMAN (CENTRAL)				
Latin I and II	109.2	124.2	107.1	122.5
Ancient History I and II	97.3	120.8	91.0	117.1
English I and II	97.0	118.8	86.7	108.7
Algebra I and II	101.8	113.2	91.0	113.9
Manual Training	.....	102.7	.....	.....
Mechanical Drawing	100.0	101.0	.....	.....
Household Arts	.....	.....	87.5	98.2
FRESHMAN (COMMERCE)				
Typewriting	70.0	100.0	80.0	88.1
Mechanical Drawing	76.0	93.0	.....	.....
Woodworking	64.0	85.3	.....	.....
Telegraphy	70.0	74.0	.....	.....
Rapid Calculation	.....	.....	60.7	86.0
Sewing	.....	.....	70.0	86.7
Cooking	.....	.....	77.5	75.2
SOPHOMORE (CENTRAL)				
Latin III and IV	140.0	144.2	128.3	133.2
Geometry I and II	109.2	134.4	106.4	127.0
Biology I	112.5	133.7	101.7	122.6
English III and IV	114.0	131.2	96.2	125.0
Mechanical Drawing	.....	127.5	.....	.....
Household Arts	.....	.....	.....	108.7
SOPHOMORE (COMMERCE)				
Algebra, Science and Math.	70.0	107.0	.....	.....
Typewriting	80.0	100.0	90.0	91.8
Bookkeeping	100.0	100.0	82.5	91.8
Cooking	.....	.....	80.0	94.0
Sewing	.....	.....	80.0	89.0

TABLE I—Continued

	Boys		Girls	
	Median Scores of Failed Students	Median Scores of Passed Students	Median Scores of Failed Students	Median Scores of Passed Students
JUNIOR (CENTRAL)				
Latin III and IV	142.5	146.5	.....	.....
Latin II, III, IV, V	.....	.....	130.0	139.7
English V and VI	129.0	140.5	106.6	134.1
Amer., Anc., and Eng. Hist.	126.6	139.2	110.0	140.0
Algebra III	.....	138.0	100.0	133.0
French I and II	131.2	133.6	125.0	135.8
Physics	.....	133.6	.....	.....
Household Arts	.....	.....	.....	115.0
JUNIOR (COMMERCE)				
Mechanical Drawing	102.5	106.3	.....	.....
Typewriting	90.0	106.0	105.0	98.9
Bookkeeping	.....	95.0	60.0	113.7
Stenography	.....	.....	87.0	99.0
SENIOR (CENTRAL)				
Latin V, VI, VII, VIII	.....	158.9 ^a	112.5	150.0
French and Latin	130.0	154.3	.....	.....
English VII and VIII	.....	147.5	.....	138.1
Chemistry	127.5	146.6	.....	138.0
Algebra III, Geometry and Trig.	90.0	146.6	.....	.....
American History	125.0	141.4	111.6	136.6
Bookkeeping	.....	135.0	.....	132.5
French II, III, IV	.....	.....	117.5	147.1
Household Arts	.....	.....	.....	125.5

^a Includes Juniors and Seniors.

In answering the second question the school marks given in the two high schools were studied. The same marking system is used in both schools. The distributions of marks show that a much smaller percent of pupils failed in the Commerce High than in the Central High. Thus, either the standards for success are relatively lower for the vocational subjects taught in Commerce High or a less degree of intelligence is required for success in them.

The results obtained in this investigation would suggest the desirability of testing prospective high-school students as to their capacities before choosing the subjects which they attempt. There must inevitably be many misfits by our present empirical method. Intelligence tests have not yet been brought to the point of infallibility, but if skillfully used they can be of great service. It would, of course, be desirable to have a test which would measure capacity for vocational subjects in the same way that the Alpha Test measures capacity for the classical subjects. This would provide a positive means rather than a negative means of selecting pupils for vocational training.

I. N. MADSEN

State Normal School, Lewiston, Idaho

A Social Survey of the Needs in Current Reading

Dr. Walter R. Smith in "An Introduction to Educational Sociology," names four specific means of socializing the curriculum in our schools. These four means are, the elimination of the material least useful; the addition of wide ranges of knowledge demanded but not now included in school courses; the organization of this new material in harmony with the old into a well-rounded program; and the socialization of the methods of teaching the reorganized material. Professor Smith further says: "For both eliminations and additions the social survey is necessary. In just what subjects, and in just what materials in these subjects, has society a right to expect that the pupils leaving a school will be proficient? This can be determined only by learning what the larger society which the children are about to enter demands of its mature citizens."

The problem of this survey was to discover the lines of study (and their relative proportion) which are necessary for reading our weekly magazines intelligently.

The Independent was taken as a typical American weekly and a survey of this magazine for one year was made. The method of investigation was to record data concerning the amount of attention paid by *The Independent* to the various topics it discussed. Fifty-two copies of the magazine were examined and the number of columns given to the various topics tabulated. The results are shown in Table I. The classifications were purely arbitrary. It was impossible to avoid a certain amount of overlapping of the various lines of study, since there is no sharp line of demarcation within facts which may be classified equally well as belonging to economics, sociology, history, and civics. The study was made before the war and the conclusions are such as would apply to normal times.

In the fifty-two issues we find that 583 columns were devoted to modern political history. Under this heading were discussed political situations in foreign countries, wars, treaties, revolutions, peace negotiations, and diplomatic relations. Since the war this kind of reading will continue to be far bulkier than ever before.

Next in importance is the study of economics, covering 462 columns. Important topics discussed are: business, finance, currency, stock exchange, cost of living, tariff, income, corporation matters, inheritance tax, capital and labor, interstate commerce.

American civics and politics occupy 410 columns. The leading topics discussed are: state and national legislative measures, political parties, elections and appointments, women's suffrage, administrative measures, government ownership, municipal government.

Next comes sociology with 325 columns. The main topics are: great interests which make up American life, social organization, social service, development of community life, the care of defectives, immigration, the race question, women's clubs.

The space occupied by each of the other topics is given in Table I, and their scope is indicated in a general way by the captions. The total number of columns is 3,910.

These various topics readily group themselves under five main heads: (1) cultural, with 1,337 columns, including fine arts, biography, education, fiction, religion, ethics, humor, and poetry; (2) political, with 993 columns, including modern political history and American civics and politics; (3) economic, with 827 columns, including applied economics, commercial geography, and insurance; (4) social, with 433 columns, including public health and sociology; (5) scientific, with 320 columns, including physical geography, agriculture, and applied science.

TABLE I. NUMBER OF COLUMNS DEVOTED TO TOPICS IN 52 COPIES OF THE "INDEPENDENT"

Topics	Columns
Modern Political History.....	583
Economics.....	462
Civics and Politics.....	410
Sociology.....	325
Fiction.....	292
Education.....	260
Biography (Articles about People).....	204
Fine Arts.....	196
Commercial Geography.....	190
Insurance.....	175
Religion.....	167
Science.....	115
Physical Geography.....	111
Public Health.....	108
Agriculture.....	94
Ethics.....	90
Poetry.....	77
Humor.....	51
Total.....	3,910

It is a matter of practical value to know the relative amount of attention paid by the American weeklies to matters of cultural interest compared with the amount of attention paid to topics of a political and business nature. We find in this particular case that 1,820 columns were devoted to politics and business and 1,288 columns to matters of a cultural nature. Other interesting comparisons can be made as to the amount of attention paid to public health and business, sociology and politics, education and religion.

The four classifications, modern political history, economics, civics, and sociology, show the history teacher his duty and opportunity. History should be made a thing of the present and not a fossil of the past. The textbook will serve only as a reference outline and current literature should afford a large part of the reading in these subjects. The subject matter will thereby bear more directly on the problems which the student is likely to meet.

The work of the English teacher would cover the fields of fiction, articles about people, poetry, and humor, and touch upon other topics. Why should not the English teacher also find much of her material for these subjects in current literature? The magazines constitute much the greater part of the average individual's reading after leaving school. It would seem to be the work of the English teacher to show what was good and bad in this material, to teach the student how to use it, and at the same time make him alert to contemporary life.

The work of the science teacher should be to give the student the necessary foundation and a glimpse of the various fields in order that he may read current

scientific literature intelligently and with pleasure. In this the teacher should also guide the pupil to what is worth while and call attention to the more authoritative periodicals. For many otherwise intelligent readers scientific topics are more or less of a mystery.

A survey of this type is the best means of enabling curriculum makers to secure a basis for the selection of subject matter which deals with live social issues of present or near-future value to the pupil and those that promise to be of value when the pupil becomes an adult. One good standard for judging any curriculum is the extent to which it acquaints the pupil with leading interests in present social life.

In conclusion I again quote from Professor Smith: "The socialized curriculum must include the knowledge areas that provide the facts and principles which lay the foundations of efficiency in all realms of society, but those areas upon which greatest emphasis should be placed must be determined by public demand as shown by the social survey."

W. D. ARMENTROUT

*Colorado State Teachers College,
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National Association of Directors of Educational Research

(E. J. ASHBAUGH, *Secretary and Editor*)

ANOTHER STEP FORWARD

All members of the National Association of Directors of Educational Research who were not at the annual meeting at Atlantic City and all readers of this JOURNAL who thereby show themselves to be interested in the scientific study of education will be interested in the step made by the association in restating its basis for membership. The association was originated to encourage the establishment of bureaus of educational research and to promote that type of research which has for its purpose the improvement of school efficiency. It has served this purpose well as the growth of its membership, the interest in its public programs, and the inquiries which have come to its secretary abundantly attest.

But this year, those attending the annual meeting felt that the time was ripe for a forward step and the following article was substituted for the old article on membership.

MEMBERSHIP

Membership in this association shall be of two classes—Honorary and Active.

Honorary: The honorary membership shall consist of those individuals who have distinguished themselves in the field of educational research whom the association may honor itself by election to this type of membership.

Active: The active membership shall consist of those persons who may be elected by the executive committee, or by the association after the consideration of their qualifications by the executive committee, on the presentation of satisfactory evidence in the form of published or unpublished studies which show ability to arrange, to organize, and to conduct research investigations and experiments.

Thus our association becomes the first and only association which places ability in educational research, attested by the submission of evidence of work already done, as the qualification for membership. The National Society for the Study of Education and the National Society of College Teachers of Education are both notable organizations, having among their members many of the best workers in educational research in our country, but they have not required that applicants for membership should present evidence of ability in this line.

Those who sponsored the change presented the following argument which made instant appeal to the members present. The movement for careful scientific educational research is already well under way in universities, colleges, normal schools, state departments, and city school systems. The present need is not so much to foster the establishment of new bureaus, though that remains as one of the purposes of the association, as it is to unify the research activities of the workers all over the country and to bring together for mutual help and encouragement those who are

originating, organizing and directing educational investigations and experimentations. In other words, the association felt that its own needs and the needs of those who, while not in organized bureaus of research, were doing work of real value were identical.

The executive committee who must pass upon the credentials submitted, faces the new situation with both hope and fear. It hopes that the appeal for membership which the association thus frankly makes will be met with a hearty response from the best workers who have hitherto been ineligible. It fears that some applications may come from those who have done one piece of research of perhaps fair or even excellent quality but who have since been resting contented with whatever impetus that one piece may have given them. It hopes that the present membership will scan carefully not only the past but also the present work of those whom they may recommend for consideration. It is ambitious that our association shall have the largest proportion of live, growing, producing educational workers of any association anywhere.

Hence, to the present membership there comes a definite challenge. Find and recommend to the executive committee those who not only have produced and are producing but who will continue to produce. And prove your own eligibility to continued membership. Let the new year be one of definite growth for each of us. Plan definitely some constructive piece of work which can be finished and reported within the next twelve months. Test your ability for original thinking. Submit yourself to stern criticism. Determine that you will meet to some degree, to a degree worthy of yourself, the demands of this new **STEP FORWARD**.

Last year in this issue of the *JOURNAL* the complete membership of our association was printed. It consisted of seventy-seven names, of which six were those of honorary members. The new list, complete according to the records of the secretary on April 1, consists of one hundred one names, of which ten are honorary. The following have resigned during the past year, due in all cases to a change in occupation: W. Randolph Burgess, C. A. Carney, F. S. Shapleigh.

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1925

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Journal of Educational Research

*Official Organ of the National Association
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PUBLISHED FOR THE BUREAU OF EDUCATION—

Journal of Educational Research

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Published for the Bureau of Educational Research, University of Illinois

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Director of Bureau of Educational Research, University of Illinois

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THE JOURNAL OF EDUCATIONAL RESEARCH is published at 450 Alameda St., Menasha, Wis., monthly except July and August by Geo. Banta, Official Printer to the Public School Publishing Co. The subscription price is \$4.00; \$4.50 in Canada or Mexico; and \$4.50 in other foreign countries.

The editorial office is at Urbana, Illinois. Address all communications on editorial matters, articles for the magazine etc. to B. R. Buckingham, University of Illinois, Urbana, Illinois.

The Public School Publishing Company conducts the subscription work. Send all orders to them at Bloomington, Illinois.

The JOURNAL OF EDUCATIONAL RESEARCH is both needed by and made the subscriptions of many more teachers and school officers.

The title page and index for Volume III are furnished with this number.

Articles to Appear Soon

In the May and June issues of this magazine will appear papers and discussions given at the Atlantic City meeting of the Association.

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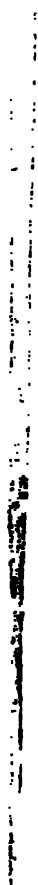
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